Journal

of the

Royal Army Medical Corps

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COLONEL W. H. HORROCKS,

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ASSISTED BY

MAJOR C. E. POLLOCK,

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Distribution List of

SURGEON-GENERALS AND COLONELS

REMOVED FROM THE CORPS AND STILL
ON THE ACTIVE LIST,

OFFICERS OF THE ROYAL ARMY MEDICAL CORPS,

RE-EMPLOYED RETIRED OFFICERS,

AND

MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

1st OCTOBER, 1913.

[This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that the list may be published as complete as possible.]

ARMY MEDICAL SERVICE.

WAR OFFICE.

Rank.	Name.	Appointment.
Surgeon-General ..	Gubbins, Sir W. L., K.C.B., M.V.O., M.B., K.H.S.	Director-General, Army Med. Service.
,, ,, ..	Babtie, W., V.C., C.B., C.M.G., M.B.	Deputy Director-General, Army Medical Service.
Colonel	O'Keeffe, M. W., M.D.	Inspector of Medical Services.
Lieutenant-Colonel .	Burtchaell, C. H., M.B.	Assistant Director-General, Army Medical Service.
,, ,, ..	Scott, B. H.	Deputy Assistant Director-General, Army Medical Service.
,, ,, ..	Stanistreet, G. B., M.B. ..	Deputy Assistant Director-General, Army Medical Service.
Major	Fell, M. H. G.	Deputy Assistant Director-General, Army Medical Service.
,, ...	Pollock, C. E.	Deputy Assistant Director-General, Army Medical Service (attached to the Department of the Director of Military Operations).

ARMY MEDICAL ADVISORY BOARD.

Rank.	Name.	Appointment.
Lieutenant-Colonel (Brevet Colonel)	Horrocks, W. H., M.B.	Expert in Sanitation.
Lieutenant-Colonel	Birt, C.	Expert in Tropical Diseases.

ROYAL ARMY MEDICAL COLLEGE.

Rank.	Name.	Appointment.
Colonel	Skinner, B. M., M.V.O.	Commandant and Director of Studies.
Major	Pilcher, E. M., D.S.O., M.B., F.R.C.S.	Professor of Military Surgery.
Lieutenant-Colonel	Robinson, O. L.	,, Tropical Medicine.
,, ,,	Beveridge, W. W. O., D.S.O., M.B.	,, Hygiene.
Major	Fawcus, H. B., M.B.	Assistant Professor of Hygiene.
Lieutenant-Colonel (Brevet Colonel)	Leishman, Sir W. B. Knt., F.R.S., M.B., K.H.P.	Professor of Pathology.
Major	Cummins, S. L., M.B.	Assistant Professor of Pathology.
Lieutenant-Colonel	Gibbard, T. W., M.B.	Lecturer in Syphilology.

SURGEON-GENERALS.

Name.	Station.	Appointment.
Anderson, L. E., C.B. ..	Dublin	Deputy Director of Medical Services, Irish Command.
Babtie, W., V.C., C.B., C.M.G., M.B.	War Office	Deputy Director-General, Army Medical Service.
Bruce, Sir D., Knt., C.B., F.R.S., M.B., F.R.C.P.	Nyasaland	(Seconded under Colonial Office.)
Corker, T. M., M.D., K.H.P.	Poona	Deputy Director of Medical Services, 6th (Poona) Division.
Hathaway, H. G... ..	Darjeeling	Deputy Director of Medical Services, 8th (Lucknow) Division.
Kenny, W. W., M.B., F.R.C.S.I., K.H.S.	York	Deputy Director of Medical Services, Northern Command.
Lloyd, O. E. P., V.C., C.B.	Pretoria	Deputy Director Medical Services, S. Africa.
MacNeece, J. G., C.B. ..	Salisbury	Deputy Director Medical Services, Southern Command.
Robinson, G. W., C.B. ..	Aldershot	Deputy Director Medical Services, Aldershot Command.
Sloggett, A. T., C.B., C.M.G., K.H.S.	Simla	Director, Medical Services, Army Head-quarters, India.
Whitehead, H. R., C.B., F.R.C.S.	London	Deputy Director of Medical Services, Eastern Command.

COLONELS.

Barratt, H. J.	Bareilly	A.D.M.S., Bareilly, Garhwal, and Dehra Dun Brigades.
Bedford, W. G. A., C.M.G., M.B.	.. ..	(Half-pay).
Birrell, W. G., M.B.	Dover	A.D.M.S., Eastern Command.
Butt, E., F.R.C.S.I... ..	.. ..	(Half-pay).
Culling, J. C.	Chester	D.D.M.S., Western Command.
Faunce, C. E.	Woolwich	A.D.M.S., Eastern Command and Officer in charge Royal Herbert Hospital.
Firth, R. H., F.R.C.S. ..	Cherat	A.D.M.S., 1st (Peshawar) Division.
Ford, R. W., D.S.O. ..	.. ..	(Half-pay).
Geddes, R. J., D.S.O., M.B.	Devonport	A.D.M.S., Southern Command.
Hunter, G. D., D.S.O. ..	India	On voyage out.
Irwin, J. M., M.B.	Hong Kong	D.D.M.S., South China.
Jencken, F. J., M.B. ..	Colchester	A.D.M.S., Eastern Command.
Kirkpatrick, R., C.M.G., M.D.	Abbottabad	A.D.M.S. Abbottabad and Sialkot Bgds.
Lucas, T. J. R., C.B., M.B...	Jubbulpore	A.D.M.S., Jubbulpore and Jhansi Brigades.
Lynden-Bell, E. H. L., M.B.	London	D.D.M.S., London District.
McGill, H. S.	.. ..	(Sick leave).
Macpherson, W. G., C.M.G., M.B., K.H.P.	Quetta	A.D.M.S., 4th (Quetta) Division, and Hon. Lecturer on Medical Services Staff College, Quetta.
Maher, J.	Gibraltar	D.D.M.S., Gibraltar.
Nichol, C. E., D.S.O., M.B.	Calcutta	A.D.M.S., Presidency Brigade.
O'Donnell, T. J., D.S.O. ..	Tidworth	A.D.M.S., Southern Command
O'Keeffe, M. W., M.D. ..	War Office	Inspector of Medical Services.
Pike, W.W., D.S.O., F.R.C.S.I.	Bombay	A.D.M.S., Bombay Brigade.
Porter, R., M.B.	Malta	D.D.M.S., Malta.
Russell, A. F., C.M.G., M.B.	Cairo	D.D.M.S., Egypt.
Sawyer, R. H. S., M.B., F.R.C.S.I.	Dublin	A D.M.S., Irish Command.
Skinner, B. M., M.V.O. ..	R.A.M. College	Commandant and Director of Studies.
Sloggett, H. M.	Belfast	A.D.M.S., Irish Command.
Tate, A. E.	Allahabad	A.D.M.S., Allahabad and Fyzabad Brigades.
Treherne, F. H., F.R.C.S. Edin.	Bangalore	A.D.M.S., Bangalore and Southern Brigades.
Trevor, H. O..	Cork..	A.D.M.S., Irish Command.
Westcott, S., C.M.G. ..	Portsmouth	A.D.M.S., Southern Command.
Woodhouse, T. P.	Edinburgh	D.D.M.S., Scottish Command.

ROYAL ARMY MEDICAL CORPS.

LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Special Qualifications.
Adams, G. G.	Secunderabad	Officer in charge Military Hospital	—
Adamson, H. M., M.B. ..	Strensall	,, ,, ,, ,,	—
Aldridge, A. R., C.S.I., M.B.	Woolwich	Officer in charge Medical Division Royal Herbert Hospital	2.
Allen, S. G.	Gibraltar	Officer in charge Military Hospital and O.C. No. 28 Coy. R.A.M.C.	2.
Austin, J. H. E.	Edinburgh..	Medical Inspector of Recruits, Scottish Command.	—
Barefoot, G. H.	London	Officer in charge Queen Alexandra Military Hospital and O.C. No. 35 Coy. R.A.M.C.	—
Bate, A. L. F.	Preston	Officer in charge Military Hospital	—
Beach, T. B.	Alexandria..	,, ,, ,, ,,	—
Berryman, W. E... ..	Woking	,, ,, ,, ,,	—
Beveridge, W. W. O., D.S.O. M.B.	R.A.M. College	Professor of Hygiene	2.
Bewley, A. W.	York	D.A.D.M.S. Northern Command	—
Birt, C.	London	Expert in Tropical Diseases, Army Medical Advisory Board	—
Blackwell, C. T., M.D. ..	Rangoon	Officer in charge Military Hospital	2.
Blenkinsop, A. P. ..	Simla	Assistant Director, Medical Services (British Service), Army Headquarters, India	—
Braddell, M. O'D., M.B.	Cawnpore	(On leave)	—
Bray, G. A. T.	Canterbury	Officer in charge Military Hospital	—
Brogden, J. E.	Malta	Offi. in ch. Mil. Hosp., Imtarfa..	—
Brown, H. H., M.B. ..	Newcastle	Officer in charge Military Hospital and S.M.O. North Eastern Coast Defences	—
Browne, E. G.	Peshawar	Officer in charge Military Hospital	2.
Buist, H. J. M., D.S.O., M.B.	Pretoria	Offi. in ch. Mil. Hosp., Roberts' Heights, and O.C. No. 23 Coy. R.A.M.C.	—
Bullen, J. W., M.D. ..	Meerut	.. ..	2.
Burnside, E. A.	Bangalore	Officer in charge Military Hospital	—
Burtchaell, C. H., M.B...	War Office	Assistant Director-General, Army Medical Service	2.
Burton, F. H. M., M.D...	Warley	Officer in charge Military Hospital	—
Caldwell, R., F.R.C.S. ..	Portsmouth	Recruiting duties	2.
Carr, H., M.D.	Ambala	Officer in charge Military Hospital	—
Clark, S. F., M.B. ..	Chester	Medical Inspector of Recruits, Western Command	2.
Connor, J. C., M.B. ..	Wellington..	Officer in charge Military Hospital	—
Copeland, R. J., M.B. ..	York	Medical Inspector of Recruits, Northern Command	—
Cottell, R. J. C.	Chelsea	Physician and Surgeon Royal Hosp.	8.
Cree, G.	Bordon	A.D.M.S., Aldershot Command..	—
Cree, H. E.	Sialkot	Officer in charge Military Hospital	—
Dalton, C...	Dublin	D.A.D.M.S. Irish Command ..	—
Daly, J. H.	Limerick	Officer in charge Military Hospital	—
Daly, T.	Chester	Officer in charge Military Hosp., O.C. No. 19 Coy. R.A.M.C. and S.M.O. North Western Coast Defences	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Davidson, J. S., M.B. ..	Agra	Officer in charge Military Hospital	—
Donaldson, J.	Jubbulpore	,, ,, ,, ,,	—
Donegan, J. F.	Woolwich	Recruiting duties	—
Eckersley, E., M.B. ..	Delhi	Officer in charge Military Hospital	2.
Elkington, H. P. G. ..	Shorncliffe	Officer in charge Military Hosp., O.C. No. 11 Coy. R.A.M.C.	2.
Elliott, C. R., M.D. ..	Jhansi	Officer in charge Military Hospital	2.
Fallon, J.	Lahore Cant.	,, ,, ,, ,,	—
Ferguson, J. D., D.S.O. ..	Straits Settlements ..	Senior Medical Officer	—
Ferguson, N. C., C.M.G., M.B.	York	Officer in charge Military Hosp., O.C. No. 8 Coy. R.A.M.C.	2.
Fletcher, H. J., M.B. ..	Rawal Pindi	Officer in charge Military Hospital	—
Forde, B., M.B.	Bulford	,, ,, ,, ,,	2
Gerrard, J. J., M.B. ..	West Africa	Senior Medical Officer	—
Gibbard, T. W., M.B. ..	London	Offi. in ch. Mil. Hosp., Rochester Row, Lecturer in Syphilology R.A.M. College, and O.C. No. 18 Coy. R.A.M.C.	7.
Girvin, J.	Ahmednagar	Officer in charge Military Hospital	—
Gordon, P. C. H. ..	Jersey	S.M.O. and Officer in charge Military Hospital, Fort Regent	—
Gordon-Hall, F.W.G., M.B.	Hong Kong	Officer in charge Military Hospital Victoria and O.C. No. 27 Coy. R.A.M.C.	—
Gray, W. L., M.B. ..	Jullundur	Officer in charge Military Hospital	2.
Green, J. S., M.B. ..	Fermoy	,, ,, ,, ,,	—
Haines, H. A., M.D. ..	Chatham	Officer in charge Military Hospital and O.C. No. 10 Coy., R.A.M.C., S.M.O., Eastern Coast Defences	—
Hale, C. H., D.S.O. ..	Maymyo	Officer in charge Military Hospital	—
Hall, R. H., M.D. ..	Bermuda	S.M.O., O.C. No. 25 Coy. R.A.M.C., and in ch. Mil. Hosp., Prospect	—
Hallaran, W., M.B. ..	Chakrata	Officer in charge Military Hospital	--
Hardy, F. W., M.B. ..	Allahabad	,, ,, ,, ,,	2.
Hardy, W. E.	Cawnpore	,, ,, ,, ,,	—
Hassard, E. M.	Karachi	,, ,, ,, ,,	—
Healey, C. W. R... ..	Nasirabad	(On leave)	—
Hearn, M. L.	Ceylon	Senior Medical Officer, in ch. Mil. Hospital, O.C. No. 26 Coy. R.A.M.C., and in ch. A.M. Stores	—
Henderson, R. S. F., M.B., K.H.P. (Brevet Colonel)	Quetta	Officer in charge Military Hospital	—
Hickson, S., M.B., K.H.S. (Brevet Colonel)	Aldershot	Offi. in ch. Cambridge Hosp. and O.C. Nos. 1 and 3 Coys. R.A.M.C.	—
Holt, M. P. C., D.S.O. ..	Kasauli	Officer in charge Military Hospital, and Civil Surgeon	5.
Holyoake, R.	Sheerness	Officer in charge Military Hospital	—
Horrocks, W. H., M.B. (Brevet Colonel)	London	Expert in Sanitation, Army Medical Advisory Board	2.
Inniss, B. J.	Mauritius	Senior Medical Officer	—
Jones, F. W. C., M.B. ..	Meerut	Officer in charge Military Hospital	—
Julian, O. R. A., C.M.G.	Chelsea	.. ..	2.
Kennedy, A.	Netley	Officer in charge "D" Block ..	—
Knaggs, H. T., M.B. ..	Cairo	Offi. in charge Mil. Hosp. Citadel, O.C. No. 33 Coy. R.A.M.C.	2.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station	Appointment.	Special Qualifications.
Lane, C. A., M.B. ..	Madras	Officer in charge Military Hospital and Indian Infantry Detachment Hospital, Perambur	—
Lavie, T. G.	Malta	Offi. in ch. Mil. Hosp., Cottonera, O.C. No. 30 Coy. R.A.M.C.	—
Leishman, Sir W. B., Knt., F.R.S., M.B., K.H.P. (Brevet Colonel)	R.A.M. College	Professor of Pathology	—
Le Quesne, F. S., V.C. ..	Gravesend	Officer in charge Military Hospital	—
Lilly, A. T. I.	Belgaum	,, ,, ,, ,,	—
Luther, A. J.	Potchefstroom	,, ,, ,, ,,	—
McCulloch, T., M.B. ..	Netley	Officer in charge Medical Division	—
MacDonald, C. J., M.D...	Tientsin	S.M.O. and O.C. R.A.M.C. North China	—
Macdonald, S., M.B. ..	Salisbury	Medical Inspector of Recruits, Southern Command	—
Macleod, R. L. R., M.B.	Devonport	Offi. in ch. Mil. Hosp., O.C. No. 7 Coy. R.A.M.C. and S.M.O. South Western Coast Defences	2.
McLoughlin, G. S., D.S.O., M.B.	Winchester	Officer in charge Military Hospital	—
Manders, N.	Curragh	Officer in charge Military Hospital and O.C. No. 17 Coy. R.A.M.C.	—
Marks, G. F. H., M.D. ..	Dalhousie	Officer in charge Military Hospital	—
Mawhinny, R. J. W. ..	Nasirabad	,, ,, ,, ,,	2.
Meek, J., M.D.	Cosham	Offi. in ch. Alexandra Hosp., O.C. No. 6 Coy. R.A.M.C., and S.M.O. Southern Coast Defences	2.
Melville, C. H., M.B. (Brevet Colonel)	Lucknow	(Sick leave)	2.
Moores, S. G.	Aldershot	D.A.D.M.S., Aldershot Command	2.
Morgan, F. J.	Barrackpore	Officer in charge Military Hospital and Medical charge Ordnance Factories	—
Morgan, J. C.	Glasgow	Officer in charge Military Hospital	2.
Morris, A. E., M.D. ..	Cork	Officer in charge Military Hospital, O.C. No. 16 Coy. R.A.M.C., and S.M.O. South Irish Coast Defences	—
Mould, W. T.	Fyzabad	Officer in charge Military Hospital	—
Nash, L. T. M.	Hounslow	,, ,, ,, ,,	—
Newland, F. R., M.B. ..	Dover	Offi. in ch. Mil. Hosp. and S.M.O. South Eastern Coast Defences	—
O'Callaghan, D. M. ..	Hilsea	Officer in charge Military Hospital	—
O'Halloran, M., M.D. ..	Edinburgh	Officer in charge Military Hospital, O.C. No. 13 Coy. R.A.M.C., and S.M.O. Scottish Coast Defences	—
Penton, R. H., D.S.O. ..	Ranikhet	Officer in charge Military Hospital	2.
Philson, S. C.	Bareilly	,, ,, ,, ,,	—
Pocock, H. I.	Murree	,, ,, ,, ,,	16.
Rawnsley, G. T.	Manchester	D.A.D.M.S. East Lanc. Div. T.F.	—
Reilly, C. C.	Colaba	Officer in charge Military Hospital	—
Ritchie, J., M.B. ..	Subathu	.. ..	—
Robinson, O. L.	R.A.M. College	Prof. of Tropical Medicine ..	2.
Rowan, H. D., M.B. ..	Dublin	Officer in charge King George V. Hospital and O.C. No. 14 Coy. R.A.M.C.	—
Russell, J. J., M.B. ..	Salisbury	D.A.D.M.S., Southern Command	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Russell, M. W.	London	D.A.D.M.S., Eastern Command, and Instructor Medical Services, Staff College	—
Scott, B. H.	War Office	Deputy Assistant Director-General Army Medical Service	2.
Sexton, M. J., M.D. ..	Wynberg	Officer in charge Military Hospital, and O.C. No. 22 Coy. R.A.M.C.	—
Shanahan, D. D... ..	Ootacamund	D.A.D.M.S. (Mobilization), 9th (Secunderabad) Division	—
Shine, J. M. F., M.D. ..	Belfast	Officer in charge Military Hospital, O.C. No. 15 Coy. R.A.M.C., and S.M.O. North Irish Coast Defences	—
Smith, F., D.S.O. (Brevet Colonel)	Calcutta	Officer in charge Military Hospital	2.
Stanistreet, G. B., M.B.	War Office	Deputy Asst. Director-General, Army Medical Service	—
Starr, W. H.	Lichfield	Officer in charge Military Hospital	—
Stone, C. A., M.D. ..	Parkhurst	,, ,, ,, ,,	—
Sutton, A. A., D.S.O. ..	Aldershot	Commandant R.A.M.C. Training Establishment, and O.C. Depôt R.A.M.C.	—
Swan, W. T., M.B. ..	Netley	Offi. in charge Royal Victoria Hosp.	—
Thompson, H. N., D.S.O., M.B.	Lucknow	(On leave)	—
Thomson, J., M.B. ..	Aldershot	Offi. in charge Records R.A.M.C.	—
Thurston, H. C., C.M.G.	Sandhurst	Surgeon Royal Military College..	—
Turner, W.	Aldershot	Offi. in charge Connaught Hosp. and O.C. No. 2 Coy. R.A.M.C.	—
Way, L.	Ferozepore	Officer in charge Military Hospital	—
Whaite, T. Du B., M.B. ..	Woolwich	S.M.O., Royal Arsenal	—
Whitestone, C. W. H., M.B.	Lahore Cant.	D.A.D.M.S. (Mobilization), 3rd (Lahore) Division	—
Will, J., M.B.	Richmond	D.A.D.M.S., Northumbrian Div. Territorial Force	—
Wilson, J. B., M.D. ..	Jamaica	S.M.O., O.C. No. 29 Coy. R.A.M.C., and in charge Military Hospital, Up Park Camp	—
Windle, R. J., M.B. ..	Poona	Officer in charge Military Hospital	—
Winter, H. E.	London	Deputy Surg. Roy. Hosp. Chelsea	—
Winter, T. B.	Colchester	Offi. in ch. Mil. Hosp. and O.C. No. 9 Coy. R.A.M.C.	2.
Wright, R. W.	Mhow	Officer in charge Military Hospital	—
Yarr, M. T., F.R.C.S.I...	London	S.M.O. London Recruiting area, and Medical Inspector of Recruits, London District	7.
Young, C. A.	Shrewsbury	D.A.D.M.S., Welsh Division T.F.	—

MAJORS.

Addams-Williams, L. ..	Tidworth	Coy. Offi. No. 20 Coy. R.A.M.C.	—
Adderley, A. C.	Wynberg	Coy. Offi. No. 22 Coy. R.A.M.C.	—
Adye-Curran, S. M. ..	Sialkot	.. ..	2.
Adye-Curran, W. J. P. ..	Cosham	Specialist in Operative Surgery ..	5.
Alexander, J. D., M.B. ..	Calcutta	.. ..	—
Anderson, H. S.	Buttevant	Officer in charge Military Hospital	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Anderson, J. B.	Southampton	Embarkation Medical Officer	3.
Archer, G. J. S., M.B.	Cosham		5.
Archer, S. A.	Jullundur		7.
Argles, R. L.	India	On voyage out	—
Ashe, F.	Secunderabad	Spec. in Midwifery and Diseases of Women and Children	8.
Aylen, E. V.	Gharial	Officer in charge Military Hospital	4.
Babington, M. H.	Malta	Offi. in Med. ch. Troops, Scutari	3.
Baillie, G., M.B.	Colchester		—
Baker, W. L.	Malta	Specialist in Ophthalmology	7.
Barbour, J. H., M.B.	Ferozepore		—
Barnett, K. B., M.B., F.R.C.S.I.	Shorncliffe		12.
Barrow, H. P. W.	Jamaica	Sanitary Officer and Coy. Officer No. 29 Coy. R.A.M.C.	2.3.9.
Bartlett, B. S.	Lahore Cant.		—
Bateman, H. R.	Shorncliffe	Coy. Officer, No. 11 Coy. R.A.M.C.	3.
Beatty, M. C., M.B.	Devonport		2.
Begbie, F. W.	Mhow	Sp. in Oper. Surg. 5th (Mhow) Div.	—
Bennett, E.	Poona		—
Bennett, W., M.B.	Maymyo	D.A.D.M.S. (Sanitary) Burma Division	1.
Bennett, W. L., M.B., F.R.C.S.Edin.	Pontefract	Officer in charge Military Hospital	—
Beyts, W. G.	Roorki	,, ,, ,, ,,	—
Biggam, T., M.B.	Bordon	Officer in charge Recep. Station	—
Birrell, E. T. F., M.B.	London		7.
Black, R. B., M.B.	Egypt	Egyptian Army	—
Blackham, R. J., C.I.E.	Jutogh	Officer in ch. Military and Cant. General Hospital	2.8.
Blackwell, W. R.	Lucknow	Staff Surgeon	—
Bliss, E. W.	Quetta	Specialist in Operative Surgery, 4th (Quetta) Division	5.
Bond, J. H. R.	Naini Tal	Officer in charge Military Hospital	—
Bostock, J. S., M.B.	Agra		—
Bourke, E. A.	Pembroke Dock		2.15.
Bowen, A. W. N.	Kirkee		—
Boyle, M., M.B.	Jersey		10.
Brakenridge, F. J.	Oxford	Officer in charge Military Hospital	1.2.
Bransbury, H. A.	Belgaum	Officer in charge Cant. Hospital	4.
Bray, H. A. (Local Lt.-Col.)	Egypt	P.M.O., Egyptian Army	—
Brodribb, E.	Malta	Offi. in ch. Mil. Hosp., Valletta	7.
Brown, R. T., M.D.	Darjeeling	,, ,,	2.3.
Browne-Mason, H. O. B.	Poona		4.
Brunskill, J. H., M.B.	Dublin	Sanitary Officer	3.
Buist, John M., M.B.	Netley		2.3.9.
Burke, B. B.	Dover		13.14.
Buswell, F. R.	Jubbulpore		—
Butler, S. G.	Curragh	Specialist in Operative Surgery	5.
Campbell, J. H., D.S.O.	London	Recruiting duties	8.
Carlyon, A. F.	Mauritius	(Sick leave)	—
Carr, C. H., M.D.	Tidworth	Specialist in Dental Surgery	16.
Carroll, F. F., M.B.	Egypt	Egyptian Army	5.
Carter, J. E., M.B.	Chatham		2.
Chopping, A.	Netley	Registrar R.V. Hospital, and O.C. Nos. 4, 5 and 21 Coys. R.A.M.C.	—
Churton, J. G.	Bangalore	Specialist in Operative Surgery 9th (Secunderabad) Division	5.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Clark, E. S., M.B. ..	Holywood	Officer in charge Military Hospital	15.
Clarke, J. B., M.B. ..	Colchester	Specialist in Operative Surgery ..	5.
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Dublin	Physician and Surgeon Royal Hospital, Kilmainham, and Medical Officer Royal Hibernian School	—
Clements, R. W., M.B. ..	Wellington	Officer in Medical charge Enteric Convalescent Depôt	2.9.10.
Cochrane, E. W. W., M.B.	Aldershot	.. ..	2.3.
Collingwood, P. H. ..	Devonport	.. ..	—
Collins, D. J., M.D. ..	Kirkee	Spec. in Ophth. 6th (Poona) Div.	2.7.
Condon, E. H., M.B. ..	Cardiff	Officer in charge Military Hospital	—
Connolly, E. P.	Murree	.. ..	—
Corkery, M. P.	Fermoy	.. ..	1.
Cotton, F. W.	Nasirabad	.. ..	—
Cowan, J., M.B.	Lahore Cantonment ..	.. ..	3.
Cowey, R. V.	Tidworth	.. ..	8.
Crawford, G. S., M.D. ..	Dublin	Recruiting Medical Officer ..	2.9.
Crawford, V. J.	Mauritius	Officer in ch. Military and Mil. Families' Hosp , Curepipe, O.C. No. 31 Coy. R.A.M.C., Spec. in Midwifery and Gynæcology	8.
Crisp, G. B.	Hong Kong	On voyage out	—
Croly, W. C.	Secunderabad	.. ..	—
Crosthwait, W. S. ..	Upper Topa	Officer in charge Military Hospital	—
Cumming, C. C., M.B. ..	R.A.M. College	.. ..	2.3.
Cummins, S. L., M.B. ..	,, ,, ...	Assistant Professor of Pathology	3.9.
Cunningham, R.A., M.B.	Meerut	D.A.D.M.S. (Sanitary) 7th (Meerut) Division	2.
Curme, D. E.	Aldershot	.. ..	—
Cuthbert, J. M., M.B. ..	Edinburgh	Clinical Pathologist	3.
Dansey - Browning, G., M.R.C.P.Lond.	Gibraltar	Sanitary Officer	2.9.
Davidson, H. A., M.B.	Straits Settlements ..	On voyage out	2.
Davis, W.	Meerut	.. ..	—
Delap, G. G., D.S.O. ..	Pretoria	D.A.D.M.S., South Africa ..	—
Dennis, B. R., M.B. ..	London	Recruiting duties	3.
Dorgan, J., M.B.	Hong Kong	On voyage out	1.2.9.
Douglas, H. E. M., V.C., D.S.O.	Egypt	,, ,, ...	2.
Douglass, P. C.	Nowgong	Offi. in ch. Military Hospital and Spec. in Prevention of Disease	—
Duffey, A. C., M.D. ..	Rawal Pindi	Staff Surgeon	8.
Dunn, H. N., M.B. ..	Netley	Officer in charge Surgical Division	—
Ellery, E. E.	Cairo	Specialist in Operative Surgery ..	5.
Ellery, R. F.	Bareilly	Staff Surgeon	—
Elsner, O. W. A.	Pietermaritzburg	Offi. in ch. Mil. Hosp. and Embarkation Med. Offi., Durban	2.
Ensor, H., D.S.O., M.B.	Woolwich	Registrar Royal Herbert Hosp. and O.C. Nos. 12 and 34 Coys. R.A.M.C.	3.
Erskine, W. D., M.B. ..	Glasgow	D.A.D.M.S., Lowland Div. T.F.	—
Evans, C. R.	Malta	Coy. Offi. No. 30 Coy. R.A.M.C...	—
Evans, P., M.B.	Devonport	Specialist in Operative Surgery ..	2.5.15.
Faichnie, N., M.B. ..	Meerut	.. ..	2.9.
Fairrie, S. H., M.B. ..	Shoeburyness	Offi. in ch. Mil. and Fam. Hosp.	8.
Falkner, M. W., F.R.C.S.I.	Bermuda	Coy. Offi. No. 25 Coy. R.A.M.C., Specialist in Operative Surgery	5.
Falkner, P. H., F.R.C.S.I.	London	Recruiting duties	—

Special Qualifications.

1. State Medicine.	5. Operative Surgery.	9. Diploma in Tropical Medicine.	13. Otology.
2. Diploma in Public Health.	6. Physical Training.	10. Skiagraphy.	14. Laryngology.
3. Bacteriology.	7. Ophthalmology.	11. Psychological Medicine.	15. Specific Fevers
4. Dermatology.	8. Midwifery and Gynæcology.	12. Pædiatrics.	16. Dental Surgery

Name.	Station.	Appointment.	Special Qualifications.
Fawcett, R. F. M.	Dublin	.. ..	—
Fawcus, H.B., M.B.	R.A.M. College.	Assistant Professor of Hygiene	1.2.
Fell, M. H. G.	War Office	Deputy Assistant Director-Gen. Army Medical Service	2.9.
Ffrench, E. G., M.D., F.R.C.S.Edin.	Poonamallee	Offi. in ch. Mil. Hosp., Spec. in Derm. 9th (Secunderabad) Div.	—
Fielding, T. E., M.B.	Devonport	.. ..	3.
Fitzgerald, FitzG. G.	Dover	Offi. in Med. ch. Duke of York's Royal Military School	—
Fleming, C. E., M.B.	Pretoria	Offi. in ch. Mil. Families' Hosp., Roberts' Heights, Specialist in Ophthalmology	7.
Forrest, J. V., M.B.	Khartoum	Officer in charge Military Hospital	—
Foster, J. G., M.B.	Ahmednagar	.. ..	—
Foulds, M. F.	Belfast	Specialist in Operative Surgery	5.
Fowler, C. E. P., F.R.C.S.	Aldershot	Instructor Sch. of Army Sanitation	2.7.
Fox, A. C.	Dublin	.. ..	8.
French, H. C.	Malta	Specialist in Dermatology	2.4.
Fry, W. B.	Woolwich	Clinical Pathologist	3.
Fuhr, R. S. H., D.S.O.	,,	Medical Officer Royal Arsenal	8.
Furnivall, C. H.	Karachi	Officer in Medical charge Civil Jail	—
Gallie, J. S.	Caterham	Officer in charge Military Hospital	—
Gibson, A. W.	Poona	Specialist in Operative Surgery 6th (Poona) Division	5.
Gill, J. G.	Rangoon	.. ..	—
Goddard, G. H.	Shorncliffe	Officer in charge "Helena" Families' Hospital, Specialist in Midwifery and Gynæcology	8.
Goldsmith, G. M., M.B.	Lebong	Officer in charge Military Hospital	—
Goodwin, T. H. J. C., D.S.O.	Devonport	Coy. Officer No. 7 Coy. R.A.M.C.	5.10.
Goodwin, W. R. P.	Fyzabad	.. ..	7.
Graham, W. A. S. J.	Neemuch	Offi. in ch. Military and Followers' Hosps. and in Med. ch. Political Agency	—
Grattan, H. W.	Naini Tal	Officer in Medical charge Enteric Fever Convalescent Depôt	2.3.
Grech, J.	Warrington	Officer in charge Military Hospital	10.
Green, S. F. St. D., M.D.	Quetta	Officer in charge Fam. Hosp., Staff Surg., Spec. in Midwifery and Dis. of Women and Children 4th (Quetta) Division	8.
Greenwood, A. R.	Aldershot	Specialist in Operative Surgery Connaught Hospital	5.
Gunter, F. E., M.B.	Meerut	Specialist in Operative Surgery 7th (Meerut) Div.	5.
Gwynn, W. P.	Ireland	.. ..	—
Hall, S. O.	Hyderabad	Officer in charge Military Hospital	8.
Hamerton, A. E., D.S.O.	Nyasaland	(Seconded under Colonial Office)	3.
Harding, D. L., F.R.C.S.I.	Londonderry	Officer in charge Military Hospital	2.
Harrison, L. W., M.B.	London	Clinical Pathologist Military Hospital, Rochester Row	3.
Harrison, W. S., M.B.	London	.. ..	3.
Hartigan, J. A., M.B.	Tientsin	Officer in charge Military Hospital	—
Harvey, D., M.D.	Nyasaland	(Seconded under Colonial Office)	1.
Harvey, F.	Leeds	Officer in charge Military Hospital	2.3.9.
Hayes, E. C.	Cosham	.. ..	2.7.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Heffernan, F. J. C., F.R.C.S.I.	Mhow	.. ..	—
Henderson, P.H., M.B...	Portsmouth	Officer in charge Reception Station	1.
Hennessy, J., M.B. ..	Colaba	.. ..	—
Herrick, H.	Naini Tal	.. ..	—
Hewetson, H.	Mill Hill	Officer in charge Military Hospital	1.2.
Hewitt, E. P.	Kamptee	.. ..	—
Hime, H. C. R., M.B. ..	Bangalore	Specialist in Ophthalmology 9th (Secunderabad) Division	2.7.
Hinge, H. A.	Aldershot	.. ..	—
Hodgson, J. E.	London	Officer in Medical charge Troops Wellington Barracks	1.2.
Hooper, A. W., D.S.O. ..	Shorncliffe	.. ..	—
Houghton, G. J.	West Africa	Offi. in ch. Mil. Hosp., Wilberforce	—
Houghton, J. W. H., M.B.	Aldershot	.. ..	2.
Howell, H. A. L.	London	Med. Offi. R.A.C. Factory, Pimlico	15.
Howley, H. E. J. A. ..	Dinapore	Officer in charge Military Hospital	—
Hudleston, W. E. ..	Portsmouth	.. ..	15.
Hull, A. J., F.R.C.S. ..	London	Clinical Assist., Q.A. Mil. Hospital	—
Humphry, L.	Chatham	Specialist in Operative Surgery ..	5.
Hunt, R. N., M.B. ..	Cairo	Offi. in Med.ch.Troops, Kasr-el-Nil	—
Hyde, D. O., M.B. ..	York	D.A.D.M.S., W. Riding Div. T.F.	2.
Hyde, P. G., M.B. ..	Ceylon	Officer in ch. Mty. Hosp. Nuwara-Eliya	—
Inkson, E. T., V.C. ..	Wellington	Officer in Medical charge Cordite Factory, Aravankadu	—
Irvine, F. S., M.B. ..	R.A.M. College	Assistant to Commandant ..	—
Irwin, A. W. A.	Cork	.. ..	—
Jameson, A. D.	Peshawar	Specialist in Dermatology 1st (Peshawar) Division	4.
Jameson, J. C., M.B. ..	Woolwich	Officer in charge Surgical Division Royal Herbert Hospital	2.
Johnson, J. T., M.D. ..	Bareilly	.. ..	2.
Jones, J. L.	Calicut	Officer in charge Military Hospital	—
Jones, T. P., M.B. ..	Pembroke Dock	Officer in ch. Military Hosp. and S.M.O. Western Coast Defences	—
Keble, A. E. C.	Perth	D.A.D.M.S. Highland Div. Territorial Force	2.8.
Kelly, J. F. M., M.B. ..	Colchester	.. ..	—
Kennedy, J. C., M.D. ..	R.A.M. College	Clinical Pathologist	3.9.
Kiddle, F., M.B.	Colchester	Specialist in Ophthalmology ..	7.
Killery, St. J. B.	Bangalore	.. ..	—
Knox, E. B., M.D. ..	Norwich	.. ..	2.
Lambelle, F. W., M.B. ..	Maymyo	.. ..	5.
Langstaff, J. W.	London	Recruiting duties	—
Lauder, F. P.	Tralee	Officer in charge Military Hospital	2.
Lauder, T. C., M.B. ..	Kinsale	,, ,, ,, ,,	2.9.
Lawson, C.B., M.B. ..	Shorncliffe	.. ..	5.10.
Lawson, D.	Netley	.. ..	—
Leake, J. W.	Dover	.. ..	1.2.
Lelean, P. S., F.R.C.S. ..	Colchester	San. Officer Eastern Command ..	2.5.
L'Estrange, E. F. Q. ..	Cannanore	Officer in charge Military Hospital	—
Lewis, R. C.	Gibraltar	.. ..	—
LLoyd, L. N., D.S.O. ..	Preston	.. ..	—
Lloyd, R. H.	Multan	Officer in charge Military Hospital	—
Long, H. W., M.B. ..	Devonport	.. ..	—
Longhurst, B. W... ..	Fleetwood	Officer in charge Military Hospital	16.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Lowsley, M. M.	Ambala	Staff Surgeon and in civil Med. ch. Cantonment	8.
MacCarthy, I. A. O. ..	Woolwich	.. ..	—
McCarthy, J. McD., M.B.	Sabathu	Officer in charge Military Hospital	1.2.9.
McDermott, T., M.B. ..	Woolwich	Specialist in Ophthalmology ..	7.
McDonnell, E., M.B. ..	Lydd	.. ..	—
MacDougall, A. J., M.B.	Athlone	Officer in charge Military Hospital	3.
MacKenzie, T. C., D.S.O.	Dover	.. ..	—
MacKessack, P., M.B. ..	London	Sanitary Offi. Eastern Command	2.3.
MacLaughlin, A. M., M.B.	Madras	Staff Surgeon, Fort St. George ..	1.2.
McLennan, F., M.B. ..	Aberdeen	Adjutant School of Instruction, R.A.M.C., T.F.	—
McMunn, A.	Hong Kong	.. ..	—
McMunn, J. R.	Netley	.. ..	15.
McNaught, J. G., M.D. ..	Aldershot	Offi. in charge Isolation Hospital	2.
Macpherson, J. D. G., M.B.	Kamptee	Officer in charge Military Hospital	—
Mainprise, C. W.	Rawal Pindi	.. ..	—
Mangin, F. M.	Allahabad	.. ..	7.
Marriott, E. W. P. V. ..	Mullingar	Officer in charge Military Hospital	10.
Martin, C. B., M.B. ..	Cahir	,, ,, ,, ,,	—
Martin, H. G.	Dublin	.. ..	8.
Martin, J. F., M.B. ..	Sandhurst	Assistant-Surgeon R.M. College ..	2.
Master, A. E., M.B. ..	Windsor	Officer in charge Military Hospital	14.
Matthews, J.	Secunderabad	.. ..	7.
Maurice, G. T. K. ..	Tidworth	.. ..	12.
Milner, A. E.	Birmingham	Recruiting duties	10.
Mitchell, A. H. McN. ..	Dover	.. ..	7.
Mitchell, L. A., M.B. ..	Aldershot	.. ..	—
Moore, G. A., M.D. ..	Chatham	Officer in charge Mil. Fam. Hosp.	14.
More, L. P., M.B. ..	Secunderabad	.. ..	—
Morgan, C. K., M.B. ..	Aldershot	Instructor, Training School ..	10.
Morphew, E. M.	Bury	Officer in charge Military Hospital	--
Morris, A. H.	Malta	Sanitary Officer	2.3.
Morton, H. M., M.B. ..	Glasgow	.. ..	—
Murphy, J. P. J., M.B.	Potchefstroom	.. ..	2.
Myles, C. D., M.B. ..	Chester	San. Officer Western Command ..	2.9.
Nicholls, H. M., M.B. ..	Poona	.. ..	—
Nickerson, W. H. S., V.C., M.B.	Murree	D.A.D.M.S.(Sanitary) 2nd (Rawal Pindi) Division	2.3.
Norman, H. H., M.B. ..	Woolwich	.. ..	—
Norrington, H. L. W. ..	Malta	.. ..	8.
O'Flaherty, A. R. ..	Kasauli	.. ..	—
O'Gorman, C. J., D.S.O.	Calcutta	.. ..	—
O'Grady, S. de C., M.B...	London	Medical Officer of the Tower ..	1.
O'Reilly, H. W. H., M.B.	Colchester	Recruiting duties	—
O'Reilly, P. S.	Secunderabad	.. ..	7.
Ormsby, G. J. A., M.D. ..	Landour	Officer in charge Military Hospital	—
Packer, H. D.	Devonport	Clinical Pathologist	3.
Palmer, F. J.	Mhow	.. ..	5.
Palmer, H. K.	Aden	Officer in charge Military Hospital	—
Parkes, E. E., M.B. ..	Plymouth	Specialist in Ophthalmology ..	7.
Parry, F. M., M.B. ..	Mauritius	Offi. in ch. Detention Hosp., Vacoas	2.
Parsons, A. R. C... ..	Edinburgh	Specialist in Operative Surgery	5.
Penny, F. S., M.B. ..	Hong Kong	Sanitary Officer and Coy. Officer No. 27 Coy. R.A.M.C.	1.2.
Perry, S. J. C. P., F.R.C.S.I.	Deolali	Offi. in ch. Mil. and Cant. Hosp.	10.
Pilcher, E. M., D.S.O., M.B., F.R.C.S.	R.A.M. College	Professor of Military Surgery ..	5.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Pinches, H. G.	Straits Settlements ..	Officer in charge Military Hospital, Tanglin, O.C. No. 32 Coy., R.A.M.C.	—
Poe, J., M.B.	Shorncliffe	.. ..	—
Pollock, C. E.	War Office	Deputy Assist. Director-General Army Medical Service	4.10.
Popham, R. L.	Cork	Coy. Officer No. 16 Coy. R.A.M.C.	—
Porter, F. J. W., D.S.O.	Secunderabad	.. ..	—
Potter, T. J.	Cairo	Clinical Pathologist and Company Officer No. 33 Company R.A.M.C.	2.3.
Powell, E. E.	Aldershot	.. ..	—
Powell, E. W.	Ballincollig	Officer in charge Military Hospital	3.
Powell, J., M.B.	Egypt	Egyptian Army	—
Power, W. M.	Chatham	.. ..	8.
Prescott, J. J. W., D.S.O.	Portland	Officer in charge Military Hospital	7.
Probyn, P. J., D.S.O., M.B.	Lincoln	,, ,, ,, ,,	2.
Profeit, C. W., M.B. ..	London	Spec. in Otology Military Hosp., Rochester Row	14.
Prynne, H. V.	Woolwich	Med. Offi. Roy. Military Academy	7.
Purser, L. M., M.B. ..	Sialkot	.. ..	13.14.
Rattray, M. MacG., M.B.	Brighton	Officer in charge Military Hospital	—
Read, H. W. K.	Rangoon	.. ..	—
Riach, W., M.D.	London	Specialist in Ophthalmology Q.A. Military Hospital	2.7.
Richards, F. G.	Queenstown	Officer in charge Military Hospital	—
Riddick, G. B.	Aldershot	.. ..	—
Ritchie, T. F., M.B. ..	London	Coy. Officer No. 18 Coy. R.A.M.C.	—
Robinson, J. H.	Cherat	Offi. in ch. Military Hosp., Spec. in Midwifery, 1st (Peshawar) Division, Staff Surgeon	8.
Roch, H. S.	Pretoria	.. ..	3.
Rogers, H., M.B... ..	Malta	Officer in ch. Mil. Hosp., Forrest	—
Ronayne, C. R. L., M.B.	Gibraltar	Coy. Officer No. 28 Coy. R.A.M.C., Specialist in Ophthalmology	7.
Ross, N. H., M.B. ..	Aldershot	Company Officer, Nos. 1 & 3 Coys. R.A.M.C.	3.
Rowan-Robinson, F. E., M.B.	Bermuda	Offi. in ch. Mil. Hosp. St. George's	—
Rutherford, N. J. C., M.B.	Cork	.. ..	2.
Ryan, E.	Aldershot	Officer in charge Louise Margaret Families' Hosp., Spec. in Midwifery and Gynæcology	8.
Safford, A. H.	Naini Tal	D.A.D.M.S. (Sanitary) 8th (Lucknow) Division	2.3.
Samman, C. T.	Mhow	Specialist in Mental Science ..	2.11.
Sampey, A. W.	Fyzabad	Officer in ch. Brigade Laboratory	2.9
Scott, A. L.	Aldershot	Officer in charge Reception Station Deepcut and Blackdown	3.
Seeds, A. A., M.D. ..	Kuldana	Officer in charge Military Hospital	—
Sewell, E. P., M.B. ..	Ceylon	Sanitary Officer	1.2.
Shea, H. F., M.B. ..	Ambala	.. ..	—
Sheehan, G. F.	Cawnpore	Officer in Medical charge Harness and Saddlery Factory, Specialist in Mental Science	11.
Siberry, E. W.	London	Recruiting duties	—
Silver, J. P., M.B. ..	Kilworth	Officer in Medical charge Camp..	—
Simson, H.	Muttra	Officer in charge Military Hospital	1.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Skinner, R. McK.	Curragh	Coy. Officer No. 17 Coy. R.A.M.C.	8.
Slayter, E. W., M.B.	Mount Abu	Offi. in charge Mil. Hosp. and in Med. charge Lawrence School, and Residency Surgeon	—
Sloan, J. M., D.S.O., M.B.	Quetta	.. ..	1.
Smith, C. S., M.B.	Dum Dum	Offi. in ch. Mil. and Departmental Foll. Hosp., Cant. Disp., Gun and Shell Factory	—
Smith, L. F., M.B.	Nowshera	.. ..	2.15.
Smith, S. B., M.D.	Belfast	Sanitary Officer Belfast District	2.
Smithson, A. E., M.B.	Dublin	Officer in charge Royal Infirmary	2.9.
Sparkes, W. M. B.	West Africa	On voyage out	13, 14.
Spiller, W. M. H., M.B.	Liverpool	Adjutant School of Instruction R.A.M.C. T.F.	2.3.
Staddon, H. E.	Rawal Pindi	.. ..	—
Stallard, H. G. F.	Peshawar	.. ..	—
Stammers, G. E. F.	Quetta	D. A. D. M. S. (Sanitary) 4th (Quetta) Division	1.2.
Statham, J. C. B.	West Africa	Sanitary Officer	2.3.9.
Steel, E. B., M.B.	Exeter	Officer in charge Military Hospital	11.
Steele, W. L.	Tidworth	Specialist in Operative Surgery	5.
Stephens, F. A.	Gharial	.. ..	—
Straton, C. H.	Pretoria	Sanitary Officer	1.2.
Swabey, M.	St. Thomas' Mount	Officer in charge Section and Cantonment Hospital	12.
Sweetnam, S. W.	.. ..	(Sick leave)	—
Symons, F. A., M.B.	Gosport	.. ..	—
Tate, G. W., M.B.	Dublin	Medical Inspector of Recruits, Irish Command	2.9.
Taylor, H. S.	Fort George	Offi. in ch. Military Hosp.	—
Taylor, W. J., M.B.	West Africa	,, ,, ,, ,, Tower Hill	2.10.
Thom, G. St. C., M.B.	Murree	D.A.D.M.S. (Mobilization) 2nd (Rawal Pindi) Division	13.14.
Thompson, A. G., M.B.	Pachmarhi	Offi. in charge Mil. and Cant. Hosp.	2.
Thomson, C. G.	Glencorse	Officer in charge Military Hospital, Specialist in Dermatology	4.
Thorpe, L. L. G.	India	On voyage out	—
Thurston, H. S.	Dublin	.. ..	—
Tibbits, W., M.B.	India	On voyage out	—
Tobin, J.	Gibraltar	Offi. in charge Garrison Dispensary, Spec. in Midwifery and Gynæcology	8.
Tyacke, N.	Devonport	.. ..	—
Unwin, T. B., M.B.	West Africa	Officer in charge Military Hospital, Mount Auriol	—
Walker, F. S., F.R.C.S.I.	Queenstown Harbour	Officer in Medical charge Troops Fort Camden	—
Walton, H. B. G.	Ranikhet	Officer in ch. Bareilly Bde. Lab.	2.3.
Wanhill, C. F.	Mhow	D.A.D.M.S. (Sanitary) 5th (Mhow) Division	2.3.
Ward, W. A.	London	.. ..	4.
Waring, A. D., M.B.	Hilsea	.. ..	—
Waring, A. H.	Gosport	Officer in charge Military Hospital	10.
Waters, W. J.	Tientsin	.. ..	—
Watts, B.	Meerut	Spec. in Midwifery and Diseases of Women and Children 7th (Meerut) Division	2.8.

Special Qualifications.

1. State Medicine.	5. Operative Surgery.	9. Diploma in Tropical Medicine.	13. Otology.
2. Diploma in Public Health.	6. Physical Training.	10. Skiagraphy.	14. Laryngology.
3. Bacteriology.	7. Ophthalmology.	11. Psychological Medicine.	15. Specific Fevers.
4. Dermatology.	8. Midwifery and Gynæcology.	12. Pædiatrics.	16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Webb, A. L. A.	Edinburgh	Sanitary Offi. Scottish Command	1.2.9.
Weld, A. E.	Malta	Officer in charge Military Families' Hospital, Valletta, Specialist in Midwifery and Gynæcology	8.
West, J. W., M.B.	Murree	Spec. in Oper. Surg. 2nd (Rawal Pindi) Division, Staff Surgeon	2.5.
Weston, A. F.	Jamaica	Offi. in ch. Mil. Hosp. Port Royal	3.
Whelan, J. F., M.B.	Poona	D.A.D.M.S. (San.) 6th (Poona) Div.	2.
Williamson, A. J., M.B.	Straits Settlements	Officer in charge Military Hospital, Blakan Mati, Specialist in Operative Surgery	5.
Wilson, R. C., M.B.	Gibraltar	Officer in charge Operating and X-ray Rooms	13.14.
Winder, J. H. R., M.D.	Aldershot	In Medical charge Families, Wellington Lines	—
Wingate, B. F.	Bellary	Officer in charge Military Hospital	—
Winkfield, W. B.	Maymyo	.. ..	—
Winslow, L. F. F.	Sheffield	Officer in charge Military Hospital	—
Withers, S. H., M.B.	Dagshai	,, ,, ,, ,,	—
Wood, L.	Quetta	.. ..	—
Woodley, R. N.	Cardiff	Adjutant School of Instruction, R.A.M.C. T.F.	—
Woodside, W. A.	Chakrata	.. ..	—
Worthington, Sir E. S., Knt., M.V.O.	Canada	Med. Offi. to Governor-General and Commander-in-Chief	5.
Wroughton, A. O. B.	Maidstone	Officer in charge Military Hospital	4.
Young, A. H. O.	Jullundur	Civil Surgeon	—

CAPTAINS.

Name.	Station.	Appointment.	Special Qualifications.
Ahern, D.	Cairo	Offi. in Med. ch. Troops Abbassia	—
Ahern, M. D.	Bermuda	Offi. in ch. N.D. Hosp., Watford	—
Ainsworth, R. B.	Tidworth	Sanitary Offi., Salisbury Plain	2.3.
Amy, A. C., M.B.	Agra	.. ..	—
Anderson, J. A., M.B.	Edinburgh	Coy. Officer No. 13 Coy. R.A.M.C.	9.
Anderson, R. G.	Egypt	Egyptian Army	—
Andrews, L. A. A.	Cork	.. ..	4.
Anthonisz, E. G.	Belfast	.. ..	—
Archibald, R. G., M.B.	Egypt	Egyptian Army	—
Arthur, A. S., M.B.	Liverpool	Recruiting duties	—
Bagshawe, H. V.	Cairo	Sanitary Officer	1.
Balck, C. A. J. A., M.B.	Dublin	Specialist in Physical Training	2.6.
Beadnell, H. O. M.	Tidworth	.. ..	—
Beaman, W. K.	Malta	.. ..	—
Beckton, J. J. H.	Sialkot	.. ..	—
Bell, J. G., M.B.	Straits Settlements	On voyage out	2.13.
Bell, W. J. E., M.B.	London	.. ..	—
Benett, A. M.	Mhow	.. ..	—
Bennett, J. A., M.B.	..	(Sick leave)	—
Benson, C. T. V.	Bangalore	.. ..	—
Benson, W., M.B.	Woolwich	.. ..	7.
Bevis, A. W.	Belfast	.. ..	—
Blackwell, T. S.	Colchester	.. ..	1.
Blake, H. H., M.B.	Peshawar	Staff Surgeon	—
Bond, A. H.	Limerick	.. ..	—
Booth, E. B., M.D.	Dundalk	Officer in charge Military Hospital	—
Bowle, C. W.	Jubbulpore	.. ..	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Bowle, S. C.	Newbridge	Officer in charge Military Hospital	16.
Boyd, J. E. M.	Ferozepore	Officer in charge Bde. Laboratory	—
Bracken, G. P. A. ..	Northern Command ..	.. ..	—
Bradish, F. L.	Ireland	.. ..	—
Bradley, F. H., M.B. ..	Allahabad	Spec. in Op. Surg. 8th (Lucknow) Div.	—
Bramhall, C.	Birmingham	Adjutant School of Instruction, R.A.M.C. T.F.	—
Bridges, R. H.	Manchester	Adjutant School of Instruction, R.A.M.C. T.F.	—
Brown, G. H. J., M.B. ..	Aberdeen	Officer in charge Military Hospital	3.
Browne, C. G.	Netley	.. ..	—
Browne, T. W.	Jhansi	.. ..	—
Browne, W. W.	Poona	.. ..	2.6.
Bryden, R. A.	Preston	.. ..	—
Buchanan, R. J. B. ..	Netley	.. ..	2.3.
Buist, D. S., M.B. ..	Egypt	Egyptian Army	—
Burney, W. H. S. ..	Campbellpore	Officer in ch. Mil. Hosp. and Cant. Dispensary	—
Byam, W...	Egypt	Egyptian Army	—
Byatt, H. V. B.	Purandhur	Officer in charge Military Hospital	—
Byrne, A. W., M.B. ..	Kasauli	Officer in charge Bde. Laboratory	2.
Caddell, E. D., M.B. ..	Aden	Offi. in ch. Section Hosp., Crater, Staff Surgeon	—
Cahill, R. J., M.B. ..	Belfast	.. ..	2.
Campbell, J. H., M.B. ..	Edinburgh	.. ..	2.
Cane, A. S.	Kirkee	Specialist in Dermatology ..	—
Carmichael, D. G., M.B.	Khanspur	Officer in ch. Mil. and Cant. Hosp.	—
Carmichael, J. C. G., M.B.	Manchester	Officer in charge Military Hospital	2.
Carruthers, V. T., M.B., F.R.C.S.Edin.	Colchester	.. ..	—
Carson, H. W., M.B. ..	Peshawar	.. ..	—
Carter, H. St. M., M.D..	Netley	Specialist in Operative Surgery..	5.
Casement, F., M.B. ..	Lucknow	Specialist in Dermatology ..	—
Cassidy, C., M.B... ..	Egypt	Egyptian Army	—
Cathcart, G. E.	Jubbulpore..	Staff Surgeon	6.
Chapman, F. H. M. ..	Meerut	.. ..	—
Churchill, G. B. F. ..	Bulford	Officer in ch. Mil. Fam. Hosp. ..	—
Clark, J. A., M.B. ..	Egypt	Egyptian Army	—
Clarke, C., M.B., F.R.C.S.	Malta	.. ..	—
Clarke, F. A. H.	Darjeeling	Officer in charge Bde. Laboratory	1.
Coates, T. S., M.B. ..	Woolwich	Medical Officer, Royal Arsenal ..	—
Collet, G. G., M.B. ..	Quetta	.. ..	—
Collins, R. T.	Buddon	Officer in charge Field Hospital ..	—
Comyn, K., M.B... ..	Gibraltar	Officer in ch. Path. Laboratory ..	—
Connell, H. B. ..	Western Command ..	.. ..	—
Conway, J. M. H., F.R.C.S.I.	Leeds	Adjutant School of Instruction, R.A.M.C. T.F.	—
Conyngham, C. A. T., M.B.	Mhow	Specialist in Dermatology ..	—
Cooke, O. C. P.	Cork	.. ..	—
Coppinger, C. J., M.B. ..	R.A.M. College	Clinical Pathologist	3.
Corbett, D. M., M.B. ..	Ambala	.. ..	—
Cordner, R. H. L. ..	Aldershot	Offi. in Med. ch. Royal Flying Corps	6.
Cotterill, L.	,, ...	O.C. "C" Coy. Depôt, R.A.M.C. and Instructor in Musketry	1.
Craig, B. A.	Newcastle	Adjutant School of Instruction, R.A.M.C. T.F.	—
Crawford, J. M. M., F.R.C.S.I.	Ipswich	Adjutant School of Instruction, R.A.M.C. T.F.	—

Special Qualifications.

1. State Medicine.	5 Operative Surgery.	9. Diploma in Tropical Medicine.	13. Otology.
2. Diploma in Public Health.	6. Physical Training.	10. Skiagraphy.	14. Laryngology.
3. Bacteriology.	7. Ophthalmology.	11. Psychological Medicine.	15. Specific Fevers.
4. Dermatology.	8. Midwifery and Gynæcology.	12. Pædiatrics.	16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Cromie, M. J.	Chatham	.. ..	—
Crossley, H. J.	Richmond, York	Officer in charge Military Hospital	—
Cummins, A. G., M.B.	Egypt	Egyptian Army	—
Cunningham, F. W. M., M.D.	Kalabagh	Officer in charge Military Hospital	—
Dalgliesh, F. B.	Jubbulpore	Officer in Medical charge Gun Carriage Factory	—
Davidson, P., D.S.O., M.B.	Aldershot	Adjutant, Depôt R.A.M.C.	6.
Davies, R. M., M.B.	Pretoria	.. ..	—
Davis, A. H. T.	Malappuram	Officer in charge Military Hospital	—
Davy, P. C. T., M.B.	Gravesend	.. ..	—
Dawson, A., M.B.	Curragh	.. ..	2.
Dawson, F. W. W., M.B.	Jullundur	Officer in charge Bde. Laboratory	—
Dawson, G. F., M.B.	Chakrata	Officer in charge Cant. Hospital	—
De la Cour, G., M.B.	Dublin	.. ..	—
Denyer, C. H.	Landour	.. ..	—
Dickenson, R. F. O'T.	Bareilly	.. ..	2.
Dickson, H. S.	Gibraltar	Embarkation Medical Officer	—
Dickson, R. M., M.B.	Lucknow	.. ..	—
Dickson, T. H., M.B.	Gibraltar	.. ..	—
Dill, M. G., M.D.	Ayr	Officer in charge Military Hospital	—
Dive, G. H., M.R.C.P.	Peking	,, ,, ,, ,,	2.
Doig, K. A. C.	Alderney	,, ,, ,, ,,	—
Douglass, J. H., M.D.	Enniskillen	,, ,, ,, ,,	2.
Dowling, F. T., M.B.	Nowshera	.. ..	—
Drew, C. M., M.B.	Egypt	Egyptian Army	—
Dudding, T. S.	Colchester	Coy. Officer No. 9 Coy. R.A.M.C. and in Med. ch. Detention Bcks.	2.
Duguid, J. H., M.B.	Secunderabad	Specialist in Otology	13.
Dunbar, B. H. V., M.D.	Belfast	Company Offi. No.15 Coy. R.A.M.C.	—
Dunkerton, N. E.	London	Adjutant School of Instruction, 2nd London Div. R.A.M.C. T.F.	—
Dunn, W. J., M.B.	Thayetmyo	Officer in charge Military Hospital	—
Dunne, J. S., F.R.C.S.I.	Woolwich	Offi. in Med. ch. Royal Dockyard	—
Dwyer, P., M.B.	Dublin	Specialist in Otology	2.13.
Dykes, S. S., M.B.,	Dum Dum	.. ..	—
Easton, P. G.	Aldershot	Spec. in Midwifery. In Med. ch. Families, Stanhope Lines	8.
Edmunds, C. T.	Bulford	.. ..	—
Edwards, G. B.	Leicester	Officer in charge Military Hospital	—
Edwards, H. R.	Pretoria	.. ..	—
Egan, W., M.B.	Curragh	.. ..	—
Ellcome, J. E.	Nowgong	.. ..	—
Elliot, E. J., M.B.	Ashton	Officer in charge Military Hospital	—
Elliott, A. C., M.B.	Sialkot	.. ..	—
Ellis, W. F.	Aldershot	Specialist in Operative Surgery	5.
Elvery, P. G. M.	Cairo	.. ..	—
Emerson, H. H. A., M.B.	Derby	Adjutant, School of Instruction, R.A.M.C. T.F.	3.
Eves, T. S., M.B.	Lucknow	.. ..	—
Fairbairn, J., M.B.	West Africa	Offi. in ch. Mil. Hosp., Wonkufu	—
Farebrother, H. W.	Meiktila	Officer in charge Military Hospital	—
Farrant, P.	West Africa	Offi. in ch. Mil. Hosp., Mabanta	—
Fawcett, C. E. W. S., M.B.	Cork	.. ..	—
Fawcett, H. H. J.	Maidstone	Adjutant, School of Instruction, R.A.M.C. T.F.	6.
Ferguson, G. E.	York	Specialist in Operative Surgery	5.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Field, P. C.	Alexandria	..	—
Field, S.	Jamaica	..	—
Forrest, F.	Curragh	..	—
Forsyth, W. H., M.B.	Netley	..	9.
Foster, A. L.	Rawal Pindi	..	—
Foster, J. R.	Neemuch	..	—
Foster, R. L. V., M.B.	Crownhill	Officer in Medical charge Troops	1.
Franklin, C. L., M.B.	Potchefstroom	..	—
Franklin, R. J.	Solon	Offi. in ch. Mil. and Cant. Hosp.	—
Fraser, A. D., M.B.	Netley	Clinical Pathologist	3.
Fraser, A. E. G.	Hounslow	..	—
Fraser, A. N., M.B.	Straits Settlements	Sanitary Officer	1.
Frost, A. T., M.B.	India	On voyage out	4.
Gale, R., M.B.	Egypt	Public Health Department	—
Gall, H.	Khyra Gali	Officer in charge Military Hospital	—
Galwey, W. R., M.B.	Wellington	D.A.D.M.S. (Sanitary), 9th (Secunderabad) Division	2.
Garland, F. J., M.B.	Colchester	..	4.
Gater, A. W.	Winchester	..	—
Gatt, J. E. H., M.D.	Cawnpore	..	—
Gaunt, E. T., M.B.	Malta	..	—
Gibbon, E., M.B.	Egypt	Egyptian Army	—
Gibbon, T. H., M.D.	Dublin	..	3.
Gibson, H.	Kamptee	Officer in charge Cant. Hospital	—
Gibson, H. G.	Queenstown Harbour	Officer in Med. ch. Troops, Spike Island	—
Gibson, L. G.	Amritsar	Officer in charge Mil. and Cant. General Hospital	—
Gilmour, J., M. B., F.R.C.S.Edin.	Egypt	Public Health Department	—
Glanvill, E. M., M.B.	Newcastle	..	—
Graham, J. H., M.B.	Cosham	..	—
Grant, J. F., M.B.	Maymyo	Specialist in Electrical Science	—
Grant, M. F., M.D.	London	Adjutant 1st London Div. School of Instruction, R.A.M.C. T.F.	2.
Gray, A. C. H., M.B.	Dublin	Clinical Pathologist	3.
Gregg, R. G. S., M.B.	Karachi	Officer in charge Bde. Laboratory and Spec. in Prevention of Dis.	2.
Grogan, J. B.	Cosham	..	—
Gurley, J. H.	Netley	Specialist in Ophthalmology	7.
Hallowes, R. C., M.B.	Omagh	..	—
Hanafin, J. B., F.R.C.S.I.	Gharial	..	—
Hanafin, P. J.	Dublin	Specialist in Ophthalmology	2.7.
Harding, C. E. L., M.B.	Quetta	..	—
Harding, H., M.B.	Colchester	..	—
Harding, N. E. J., M.B.	..	(West African leave)	9.
Hart, H. P., M.B.	Wellington	Officer in charge Cant. Hospital	—
Harty, T. E.	West Africa	On voyage out	4.
Harvey, G. A. D.	R.A.M. College	Specialist in Physical Training	6.
Harvey, W. J. S.	Jamaica	..	—
Hastings, A. E. F.	Chatham	..	—
Hayes, A. H., M.R.C.P. Lond.	York	Sanitary Offi., Northern Command	2.3.
Hayes, L. C., M.B.	Bermuda	..	2.
Hendry, A., M.B.	Colaba	..	—
Heron, G. W.	Egypt	Public Health Department	—
Heslop, A. H., M.B.	Rawal Pindi	..	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Hewson, F. M., F.R.C.S.I.	Karachi	..	—
Hildreth, H. C., F.R.C.S. Edin.	Fermoy	Officer in ch. Mty. Fam. Hospital	8.
Hingston, J. C. L.	Rangoon	Officer in ch. Followers' Hospital, Spec. in Dermatology, Burma Division, Staff Surgeon	—
Hoar, J. E.	Sheerness	..	4.
Holden, C. W.	R.A.M. College	(Sick leave)	2.9.
Hole, R. B., M.B.	Glasgow	Adjutant School of Instruction, R.A.M.C. T.F.	—
Honeybourne, V. C.	Londonderry	..	—
Houston, J. W., M.B.	Cherat	D.A.D.M.S. (Sani.) 1st (Peshawar) Division	—
Howell, F. D. G.	Liverpool	Recruiting duties	—
Howell, H. L.	Ahmednagar	Officer in ch. Bde. Lab. and Cant. Hospital, Spec. in Prevention of Disease	—
Howlett, A. W., M.B.	India	..	—
Hughes, G. W. G.	Devonport	Officer in ch. Mil. Fam. Hospital	7.
Humfrey, R. E., M.B.	Kilworth	..	1.
Hutchinson, V. P.	Pretoria	..	—
Ievers, O., M.B.	Chatham	..	8.
Irvine, A. E. S.	Belfast	..	—
Irvine-Fortescue, A., M.B.	Benares	Officer in charge Military Hospital	—
Jacob, A. H.	Dublin	..	—
James, J., M.B.	Chatham	..	—
Johnson, B., M.B.	Cork	..	—
Johnson, V. G.	Dover	..	—
Johnstone, D. P.	Jhansi	Staff Surgeon, and in ch. Brigade Laboratory	2.9.
Jones, A. E. B., M.D.	Bangalore	Officer in charge Bde. Laboratory Spec. in Prevention of Disease 9th (Secunderabad) Division	—
Jones, A. G., M.B.	Rawal Pindi	Spec. in Electrical Science and Offi. in ch. Cant. General Hosp.	—
Jones, J. B., M.B.	Muttra	..	—
Joynt, H. F., M.B.	Cape Town	Officer in Medical charge Troops, Embarkation Medical Officer	—
Kavanagh, E. J., M.B.	Chatham	..	—
Keane, G. J., M.D.	Uganda	(Seconded under Colonial Office)	2.9.
Keane, M.	Bulford	..	—
Kelly, C., M.D.	Woolwich	Officer in charge Auxiliary Hosp.	—
Kelly, H. B., M.B.	Curragh	Officer in charge Military Families' Hospital	8.
Kelly, W. D. C., M.B.	Pretoria	Specialist in Operative Surgery	5.
Kempthorne, G. A.	Tregantle	Officer in Medical charge Troops	2.
Kinkead, R. C. G. M., M.B.	Bloemfontein	Officer in charge Military Hospital O.C. No. 24 Coy. R.A.M.C.	—
Kyle, S. W., M.B.	Jubbulpore	..	—
Laing, F. R., M.B.	Lucknow	..	—
Lambert, F. C.	Pembroke Dock	..	—
Lambkin, E. C., M.B.	Hong Kong	..	—
Lane, J. W., M.D.	Kamptee	..	—
Langrishe, J. du P., M.B.	Ireland	..	—
Lathbury, E. B.	Ranikhet	..	—
Leahy, M. P., M.B.	Dublin	..	—
Leckie, M.	Egypt	Egyptian Army	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Leeson, H. H.	Alexandria	.. ..	—
Leslie, R. W. D.	Gosport	.. ..	—
Leslie, T. C. C.	Cork	.. ..	—
Lewis, R. P.	Aldershot	Specialist in Physical Training ..	6.
Lewis, R. R.	West Africa	Officer in charge Military Hospital, Wilberforce	4.
Lewis, S. E., M.B. ..	Devonport	Officer in charge Military Families' Hospital	8.
Lithgow, E. G. R. ..	Upavon	Medical Offi. Central Flying School	—
Littlejohns, A. S. ..	Dublin	.. ..	—
Lloyd, J. R.	Jubbulpore	.. ..	—
Lloyd-Jones, P. A., M.B.	Aldershot	.. ..	7.
Lochrin, M. J.	Bellary	.. ..	—
Loughnan, W. F. M. ..	Aden	Officer in ch. Brigade Laboratory, Staff Surgeon Steamer Point	2.9.
Low, N.	Portsmouth	.. ..	1.
Lucas, T. C., M.B. ..	Bombay	Surg. to H.E. the Governor of Bombay	2.
Lunn, W. E. C., M.B. ..	Lahore Cant.	.. ..	—
Lynch, J. P.	Canterbury	.. ..	—
MacArthur, D. H. C., M.D.	Dalhousie	.. ..	—
MacArthur, W.P., M.D., F.R.C.P.I.	Mauritius	Sanitary Officer	2.
McCammon, F.A., M.B...	Dublin	.. ..	—
MacCarthy, D. T., M.B...	Mandalay	Officer in charge Military Hospital and Med. Offi. Indian Troops, Staff Surgeon Mandalay Brigade	—
McCombe, J. S., M.B. ..	Secunderabad	.. ..	—
McConaghy, W., M.B. ..	Woolwich	Coy. Officer Nos. 12 and 34 Coy. R.A.M.C.	—
McCreery, A. T. J., M.B.	Mhow	.. ..	—
MacDowall, W. MacD. ..	West Africa	On voyage out	—
McEntire, J. T., M.B. ..	,, ...	.. ..	2.
McEwen, O. R.	Multan	.. ..	—
McGrigor, D. B., M.B. ..	Ranikhet	.. ..	—
Mackenzie, D. F., M.B. ..	Meerut	Staff Surgeon	9.
McKenzie, J., M.B. ..	Pirbright Camp	Officer in Medical charge Troops	2.
McNeill, A. N. R., M.B. ..	Mauritius	.. ..	—
MacNicol, R. H., M.B. ..	Woolwich	Specialist in Dermatology ..	4.
McQueen, C.	Aldershot	.. ..	—
McSheehy, O. W., M.B...	Maritzburg	.. ..	—
Manifold, J. A., M.B. ..	Bermuda	.. ..	—
Marett, P. J.	Malta	.. ..	3.
Marshall, W. E., M.B. ..	Egypt	Egyptian Army	—
Mathieson, W.	Pretoria	.. ..	—
Maughan, J. St. A. ..	Netley	Coy. Officer Nos. 4, 5 and 21 Coys. R.A.M.C.	—
Maydon, W. G., M.B. ..	Glasgow	.. ..	—
Meaden, A. A.	Colchester	.. ..	—
Meadows, S. M. W. ..	Tidworth	Offi. in charge Mil. Fam. Hosp., Spec. Midwifery and Gynæcology	8.
Meldon, J. B., M.B. ..	Shorncliffe	.. ..	—
Meredith, R. G., M.B. ..	Ceylon	On voyage out	—
Middleton, E. M. ..	Rawal Pindi	.. ..	—
Millar, C. R.	.. ..	(West African leave)	—
Mitchell, T. J., M.B. ..	Lahore Cant.	Staff Surgeon	—
Mitchell, W., M.B. ..	Sabathu	Officer in ch. Cant. General Hosp.	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Moore, E. H. M.	Shoeburyness	.. ..	—
Moriarty, T. B.	Aldershot	.. ..	—
Morris, C. R. M., M.B.	Netley	.. ..	—
Moss, E. L.	Portsmouth	Officer in ch. Mil. Fam. Hospital	8
Murphy, L.	Bangalore	.. ..	—
Newman, R. E. U., M.B.	Chatham	Coy. Offi. No. 10 Coy., R.A.M.C.	—
Nicholls, T. B., M.B.	Cyprus	Officer in charge Military Hospital	—
Nicol, C. M., M.B.	Cairo	.. ..	—
Nimmo, W. C.	Aldershot	.. ..	8.
Nolan, R. H.	Glasgow	.. ..	—
O'Brien, C. W.	London	.. ..	—
O'Brien-Butler, C. P.	Kirkee	.. ..	—
O'Carroll, A. D., M.B.	Aldershot	.. ..	6.
O'Connor, A. P., M.B.	Cairo	.. ..	—
O'Connor, R. D.	Murree	Officer in charge Mil. Fam. Hosp.	—
Odlum, B. A.	Simonstown	Officer in Medical charge Troops	—
O'Farrell, W. R.	Egypt	Egyptian Army	—
O'Grady, D. de C.	Barian	Offi. in ch. Mil. Hosp., Spec. in Dermatology, 2nd (Rawal Pindi) Division	—
O'Keeffe, J. J., M.B.	Naini Tal	.. ..	—
O'Kelly, R.	Delhi	.. ..	—
Ommanney, F. M. M.	Armagh	.. ..	—
O'Neill, E. M., M.B.	Youghal	Officer in charge Military Hospital	—
O'Riordan, W. H.	Murree	Officer in charge Cant. Hospital	—
Ormrod, G., M.B.	Aldershot	.. ..	7.
O'Rorke, C. H., M.B.	Allahabad	Staff Surgeon	—
Osburn, A. C.	Netley	.. ..	4.
Otway, A. L., M.B.	Portsmouth	Sanitary Officer, Portsmouth Dist.	1.2.
Paine, E. W. M.	Manchester	Recruiting duties	—
Painton, G. R.	Colchester	.. ..	—
Pallant, S. L.	Netley	Officer in ch. Military Families' Hospital, Specialist in Otology	13.16.
Paris, R. C.	Quetta	Specialist in Dermatology 4th (Quetta) Division	—
Parkinson, G. S.	Glasgow	.. ..	—
Parsons-Smith, E. M.	Egypt	Egyptian Army	—
Pascoe, J. S.	Woolwich	Offi. in charge Mil. Fam. Hospital	8.
Patch, B. G.	Nottingham	Specialist in Otology	13.
Pennefather, E. M.	Fethard	Officer in charge Military Hospital	—
Perry, H. M. J.	Devonport	.. ..	3.
Petit, G.	Multan	.. ..	—
Phelan, E. C., M.B.	Barrackpore	Officer in charge Cant. Hospital	—
Phillips, T. McC., M.B.	Cawnpore	.. ..	—
Pollard, A. M.	Colchester	.. ..	—
Potts, E. T., M.D.	Cosham	.. ..	—
Powell, J. E.	Hilsea	Specialist in Dermatology	4.
Power, P., M.B.	India	On voyage out	4.
Priest, R. C., M.B.	Lebong	.. ..	—
Priestley, H. E.	Tidworth	.. ..	—
Purdon, W. B., M.B.	Ireland	.. ..	2.
Rahilly, J. M. B., M.B.	Shorncliffe	Specialist in Operative Surgery	5.
Ranken, H. S., M.B.	Egypt	Egyptian Army	—
Reed, G. A. K. H.	Aldershot	O.C. "A" Coy. Depôt, R.A.M.C.	6.
Rees, G. H., M.B.	Londonderry	.. ..	—
Rennie, W. B., M.B.	Hyderabad	.. ..	—
Renshaw, J. A.	Secunderabad	.. ..	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications
Richard, G. H.	Weedon	Officer in charge Military Hospital	—
Richmond, J. D., M.B.	Edinburgh	.. ..	—
Rigby, C. M.	Colaba	.. ..	—
Ritchie, M. B. H., M.B.	Mhow	D.A.D.M.S. (Mob.) 5th (Mhow) Division	—
Robb, C., M.B.	Egypt	Public Health Department	—
Roberts, F. E.	Shorncliffe	.. ..	1.
Robertson, H. G., M.B.	Malta	.. ..	—
Robinson, T. T. H., M.B.	Strensall	.. ..	—
Roche, J. J. D., M.B.	Gibraltar	.. ..	—
Rose, A. M., M.B.	Longmoor	Officer in charge Reception Station	2.
Rudkin, G. F.	Ireland	.. ..	—
Rugg, G. F.	Peshawar	Specialist in Operative Surgery, 1st (Peshawar) Division	5.
Russell, H. W., M.D.	Aldershot	Clinical Pathologist Camb. Hosp.	3.
Rutherford, R., M.B.	Straits Settlements	Offi. in ch. Mil. Hosp. Fort Canning	—
Ryles, C., M.B.	Naini Tal	.. ..	—
Ryley, C.	Bermuda	Sanitary Officer	2.
Sampson, F. C., M.B.	Woolwich	.. ..	4.
Sampson, P.	Dublin	.. ..	2.
Saunders, S. McK.	Egypt	Egyptian Army	—
Scaife, C., M.D.	Belgaum	In charge Brigade Laboratory, Spec. in Prevention of Disease	2.
Scatchard, T.	Aldershot	Specialist in Dermatology, Connaught Hospital	4.
Scott, J. W. L.	Netley	.. ..	—
Scott, T. H., M.B.	Ferozepore	.. ..	—
Seccombe, J. W. S.	Topsham	Officer in Medical charge Troops	2.
Sexton, T. W. O.	Woolwich	.. ..	—
Shepherd, A., M.B.	Agra	.. ..	—
Sherlock, C. G., M.D.	Dalhousie	Officer in charge Cant. Hospital	—
Sherren, H. G.	London	.. ..	2.
Sidgwick, H. C., M.B.	Woolwich	.. ..	5.
Sim, J. A. B., M.B.	R.A.M. College	(Sick leave)	—
Simson, J. T., M.B.	Egypt	Egyptian Army	—
Sinclair, M., M.B.	London	Officer in Medical charge Troops, Chelsea and Kensington Bks.	—
Skelton, D. S.	Zanzibar	(Seconded under Foreign Office)	2.3.
Smales, W. C.	Portsmouth	.. ..	—
Smallman, A. B., M.D. (Brevet Major)	Aldershot	Asst. Instructor School of Army Sanitation, Asst. San. Offi. A.C.	2.3.
Smyth, R. S., M.D.	Cosham	Coy. Officer No. 6 Coy. R.A.M.C.	—
Spong, W. A., M.B.	Karachi	Officer in charge Military Families' and Followers' Hospitals, Staff Surgeon, E.M.O.	—
Stack, G. H., M.B.	Aldershot	.. ..	—
Stack, H. T., M.B.	Ranikhet	Officer in charge Cant. Hosp. and Civil Surgeon	2.
Stallybrass, T. W., M.B.	Egypt	Egyptian Army	—
Stanley, C. V. B., M.D.	"	Public Health Department	—
Stanley, H. V., M.B.	Gibraltar	.. ..	—
Startin, J.	Satara	Officer in charge Military Hospital	—
Stevenson, A. L., M.B.	Nowshera	.. ..	—
Stevenson, G. H., M.B.	Lichfield	.. ..	—
Stewart, H., M.B.	Halifax	Officer in charge Military Hospital	—
Stewart, P. S., M.B.	Malta	.. ..	—
Stirling, A. D., M.B.	Khartoum	.. ..	2.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Stoney, E. C., M.B.	Shwebo	..	—
Storrs, R.	Portsmouth	..	8.
Stuart, F. J., M.B.	Chakrata	Spec. in Derm., 7th (Meerut) Div.	—
Suhr, A. C. H., M.B.	Straits Settlements	..	2.
Sutcliff, A. A., M.B.	Chester	Coy. Officer No. 19 Coy. R.A.M.C.	1.
Sylvester-Bradley, C. R.	Exeter	Adjutant School of Instruction, R.A.M.C. T.F.	6.
Symons, V. H.	Seaforth	Officer in charge Military Hospital	—
Tabuteau, G. G.	Cork	Specialist in Operative Surgery	5.
Tate, R. G. H., M.D.	Lahore Cantonment	D. A. D. M. S. (Sanitary) 3rd (Lahore) Division	2.
Taylor, G. P., M.B.	Pretoria	..	—
Thompson, R. J. C.	Egypt	Egyptian Army	—
Thompson, W. I., M.B.	Aldershot	..	—
Thomson, C. P., M.D.	Egypt	Public Health Department	—
Thomson, D. S. B., M.B.	,,	Egyptian Army	2.
Thurston, L. V.	Aldershot	..	—
Tobin, W. J.	Bangalore	..	—
Todd, R. E., M.B.	Egypt	Public Health Department	—
Tomlinson, P. S.	Roorkee	..	—
Treves, W. W., M.B., F.R.C.S.	Egypt	Public Health Department	—
Turnbull, J. A.	India	On voyage out	6.
Turner, C. H.	Dublin	Specialist in Operative Surgery	5.
Turner, F. T.	Poona	..	—
Tyndale, W. F., C.M.G., M.D.	Devonport	Sanitary Officer Plymouth District	1.2.
Varvill, B.	Nasirabad	..	—
Vaughan, E. V., M.B.	Straits Settlements	..	—
Vaughan, W. F. H.	Malta	On voyage out	5.
Vidal, A. C.	Aldershot	..	—
Walker, N. D., M.B.	Quetta	Officer in Medical ch. Staff College	2.6.
Walker, S. G., M.B.	Cawnpore	Officer in charge Departmental Followers' Hospital	—
Wallace, G. S., M.B.	Aldershot	Coy. Officer No. 2 Coy. R.A.M.C.	2.
Ware, G. W. W., M.B.	Kilkenny	Officer in charge Military Hospital	—
Watson, D. P., M.B.	Nyasaland	(Seconded under Colonial Office)	3.
Webster, J. A. W.	Tipperary	Officer in charge Military Hospital	—
Weddell, J. M.	Fyzabad	..	—
Wells, A. G.	Kasauli	Officer in ch. Cant. Genl. Hosp.	—
Weston, W. J.	Queenstown Harbour	Offi. in Med. ch. Troops, Haulbowline	—
Wetherell, M. C., M.D.	Kildare	Officer in charge Military Hospital	—
White, C. F., M.B.	Dublin	Specialist in Dermatology	4.
White, M., M.B.	Shwebo	Officer in charge Military Hospital	—
White, R. K.	Aldershot	Offi. in Med. ch. Families, Marlborough Lines. Spec. in Midwifery	8.
Whitehead, E. C., M.B.	Dinapore	..	—
Wiley, W., M.B.	Dover	..	—
Williams, A. S.	Kilbride Camp	Officer in charge Camp Hospital	—
Williamson, M. J., M.B.	Potchefstroom	..	—
Wilmot, R. C.	Hythe	Officer in charge Military Hospital, Specialist in Ophthalmology	7.
Wilson, H. T.	Chatham	..	—
Wilson, M. O., M.B.	Aden	..	—
Winckworth, H. C.	Woolwich	Specialist in Operative Surgery	5.16.
Winder, A.S.M., M.B.	Lucknow	..	—
Winder, M. G.	Jamaica	Offi. in ch. Mil. Hosp., Newcastle	—

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Wood, A. E. B., M.B.	Tientsin	..	—
Wood, J. L.	Naini Tal	..	—
Worthington, F., M.B.	Ceylon	..	—
Wright, A. R., M.B.	Malta	..	—
Wright, T. J.	Aldershot	O.C. "B" Coy. Depôt, R.A.M.C. and Assistant Instructor Training School	2.
Wright, W. G.	Gibraltar	..	—
Wyatt, C. J., M.B.	West Africa	Offi. in ch. Mil. Hosp., Port Lokkoh	—
Yourell, J.R., M.B.	Rangoon	..	—

LIEUTENANTS.

Name.	Station.	Appointment.	Special Qualifications.
Allison, G. F.	York	..	—
Allnutt, E. B.	London	..	—
Allott, H. W. L.	Curragh	..	—
Archer, T. C. R.	Hong Kong	..	—
Balfour, T. H., M.B.	Fort George	..	2.
Ball, W. O. W., M.B.	Aldershot	..	—
Barry, S. J.	Woolwich	..	—
Beddingfield, H., M.B.	,,	..	—
Beddows, E. C.	Curragh	..	—
Biggam, A. G., M.B.	York	..	—
Biggar, B., M.B.	Alexandria	..	—
Bissett, W., M.B.	Dagshai	Officer in charge Cant. Genl. Hosp.	—
Blackmore, H. S.	London	Officer in Medical charge Troops St. John's Wood	2.16.
Blaikie, C. J.	Aldershot	..	—
Blake, G. A., M.B.	,,	..	—
Bowie, J. D., M.B.	Cairo	..	—
Brett, P. M. J., M.B.	Jhansi	..	—
Bridges, A. H.	London	..	—
Bridges, R. F., M.B.	Cherat	Officer in charge Cant. Genl. Hosp.	—
Brown, A. G., M.B.	Dublin	..	—
Bruce, D. W., M.B.	Aldershot	Officer in charge Reception Station, Ewshott	—
Buckley, L., M.B.	Bordon	..	—
Burnett, M.	Cosham	..	—
Cairns, F. J., M.B.	..	(On probation = seconded)	—
Cane, E. G. S.	Colaba	..	2.
Carlyle, R. C., M.B.	London	..	—
Chambers, G. O.	Cairo	..	—
Christie, W. F., M.B.	Straits Settlements	On voyage out	—
Corbett, W. V.	R.A.M. College	(On probation)	—
Cowen, E. G. H., M.B.	Warley	..	—
Cowtan, F. C.	Woolwich	(On probation)	—
Crocket, J., M.B.	Edinburgh	..	—
Croker, W. P., M.B.	Dublin	..	—
Davidson, F. C., M.B.	Edinburgh	..	—
Davidson, R., M.B.	Hounslow	..	—
Davies, A. A. M.	York	..	—
Deane, E. C.	Chester	..	—
Dunbar, L., M.B.	Netley	..	—
Dyas, G. E.	..	(On probation = seconded)	—
Elliott, J. M., M.B.	Winchester	..	—

Special Qualifications.

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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Finny, C. M., M.B.	Barian	..	2.
Flood, R. A., M.B.	Woolwich	..	—
Fretz, W. L. E., M.B.	Ambala	..	—
Frobisher, J. H. M., M.B.	York	..	—
Frost, W. A., M.B.	Jubbulpore	..	—
Fyffe, E. L., M.B.	Poona	Officer in charge Cant. Hospital	—
Gaunt, J. K., M.B.	Malta	Temp. Duty at Scutari	—
Graham, W. T., M.B.	Calcutta	..	—
Hallinan, T. J., M.B.	Multan	..	2.
Hare, J., M.B.	Belfast	..	—
Harold, C. H. H., M.D.	Ambala	..	—
Hayes, P., M.B.	Bangalore	..	—
Heale, A. S.	Malta	..	—
Helm, C.	Curragh	..	—
Hemphill, R., M.B.	Netley	..	—
Hepper, J. E.	Bulford	..	—
Higgins, S. J.	Cork	..	—
Hood, A., M.B.	Lichfield	..	—
Hudleston, I. R.	Aldershot	..	—
Huggan, J. L., M.B.	London	..	—
Ingoldby, C. M.	Fermoy	..	—
Jackson, A.	Dublin	..	—
Jones, C. C., M.B.	London	..	—
Kidd, J. D., M.B.	Secunderabad	..	—
Laird, W. B.	Caterham	..	—
Lang, E. C., M.B.	Kildare	..	—
Large, D. T. M., M.B	Stobs	Officer in charge Field Hospital	—
Large, S. D.	Aldershot	..	—
L'Estrange, H. R.	Newbridge	..	—
Levack, J. S., M.B.	Nowshera	Offi. in ch. Cant. General Hosp.	—
Little, C. J. H., M.B.	York	..	—
MacIlwaine, A. G. J.	Quetta	..	—
McNaughtan, W., M.B.	Netley	..	—
Mallam, R. K., M.B.	Bordon	..	—
Martyn, A. F. C.	R.A.M. College	(On probation)	—
Monteith, H. G.	Hong Kong	..	—
Morrison, W. K., M.B.	..	(On probation = seconded)	—
O'Connell, J. F., M.B.	Aldershot	..	—
Osmond, T. E.	London	..	—
Panton, H. F., M.B.	Tidworth	..	—
Percival, E., M.B.	..	(On probation = seconded)	—
Phillipps, R. B.	Cork	..	—
Poole, L. T., M.B.	York	..	—
Porter, R. E., M.B.	Cork	..	—
Power, P. M. J.	Cosham	..	—
Pratt, W. W., M.B.	London	..	—
Price, R. B., M.B.	R.A.M. College	(On probation)	—
Rankin, H. C. D., M.B.	,, ,,	(,, ,,)	—
Reynolds, D., M.B.	Sialkot	Staff Surgeon	—
Richardson, D. T., M.B.	Edinburgh	..	—
Ritchie, J. L., M.B.	Aldershot	..	—
Robinson, F. A., M.B.	Mhow	..	—
Rowe, J., M.B.	Aldershot	..	—
Russell, E. U.	Woolwich	..	—
Sealy, H. N.	Curragh	..	—
Seaver, C. D. K.	Dalhousie	..	—
Shaw, R. G., M.B.	R.A.M. College	(On probation)	—

Special Qualifications.

1. State Medicine.
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8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Shields, H. J. S.	Pirbright Camp		—
Skrimshire, F. R. B.	Aldershot		—
Smith, E. P. A., M.B.	,,		—
Smith, S. H.	Woolwich	(On probation)	—
Spence, B. H. H., M.B.	R.A.M. College		—
Sproule, J. C.	Crownhill		—
Steven, W. S. R., M.B.	Quetta		—
Stevens, N. W., M.B.	Dover		—
Stevenson, W., M.B.	Deepcut		2.
Stewart, W., M.B.	India	On voyage out	—
Strachan, E. A., M.B.	Barry		—
Stringer, C. H.	Jamaica		—
Sykes, S. P., M.B.	India	On voyage out	—
Tamplin, F. S.	Gibraltar		—
Thornton, C. V., M.B.	Curragh		—
Todd, H. C., M.B.	India	On voyage out	—
Urquhart, A. L., M.B.	R.A.M. College	(On probation)	—
Vint, R. W., M.B.	Aldershot		—
Vivian, R. T.	Curragh		—
Wade, E. W., M.B.	..	(On probation = seconded)	—
Warburton, P. D.	..	(,, ,, ,,)	—
Way, L. F. K.	Wynberg		—
Webster, W. L., M.B.	Limerick		—
Wells, H. J. G., M.B.	India	On voyage out	—
Weston, T. A., M.B.	Lucknow		—
Whitby, E. V., M.B.	Fermoy		—
Whitehead, N. T., M.B.	R.A.M. College	(On probation)	—
Wigmore, J. B. A.	Aldershot		—
Wilson, G., M.B.	Secunderabad		—
With, P. A.	Curragh		—
Woodhouse, B.	..	(On probation = seconded)	—
Wynne, O. W. J.	India	On voyage out	—

QUARTERMASTERS.

Honorary Majors.

Name.	Station.
Brake, T. F.	London.
Hasell, H. G.	Malta.
Short, J. B.	Dublin.

Honorary Captains.

Name.	Station.
Archibald, W. N.	Netley.
Attwood, J.	Tientsin.
Audus, H. J. F.	Tidworth.
Chalk, A. J.	Egypt.
Clapshaw, A.	Pretoria.
Conolly, J. B.	London.
Cowan, R. R.	Aldershot.
Crookes, F.	Woolwich.
Exton, T.	Dover.
Gillman, J.	Depôt, Aldershot.
Glover, H. W.	Chester.

Special Qualifications.

1. State Medicine.
2. Diploma in Public Health.
3. Bacteriology.
4. Dermatology.
5. Operative Surgery.
6. Physical Training.
7. Ophthalmology.
8. Midwifery and Gynæcology.
9. Diploma in Tropical Medicine.
10. Skiagraphy.
11. Psychological Medicine.
12. Pædiatrics.
13. Otology.
14. Laryngology.
15. Specific Fevers.
16. Dental Surgery.

Name.	Station
Green, J.	York.
Hall, F. W.	Netley.
Houghton, E.	Cape Town.
Lunney, A.	Curragh.
Offord, E. P.	Cosham.
Short, G. F.	Belfast.
Spackman, H.	Chatham.
Wakefield, H. P.	Tidworth.
Watkins, J.	Aldershot.
Wheeler, A.	Shorncliffe.
Wilson, A.	Southampton.
Woolley, H.	Devonport.

HONORARY LIEUTENANTS.

Buckley, E. J.	Dublin.
Clark, J.	Woolwich.
Collard, F. E.	York.
Conway, T. D.	Devonport.
Cooper, C. H.	Dublin.
Downing, R. N.	Woolwich.
Green, R. H.	Netley.
Kinsella, C. W.	Egypt.
McColgin, T. E.	Edinburgh.
Newland, E. W.	Malta.
Osborne, J. W.	Colchester.
Saunders, E. V.	Hong Kong.
Smith, C. H.	North China.
Spencer, W. T.	Gibraltar.
Tait, A. F.	Aldershot.
Wilson, J.	War Office.

MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.
Surgeon-Major	Cowie, R. M.	1st Life Guards.
,, ,,	Pares, B.	Royal Horse Guards.
,, ,,	Power, J. H.	2nd Life Guards.
Surgeon-Captain	Bodington, P. J., M.B.	Royal Horse Guards.
,, ,,	Luxmore, E. J. H.	2nd Life Guards.
Surgeon-Lieutenant	Anderson, E. D.	1st Life Guards.

RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED.

Name.	Station where Employed.
Allport, Major C. W., M.D.	Great Yarmouth.
Anderson, Major E. C., D.S.O.	Golden Hill Fort.
Archer, Lieut.-Colonel T., M.D.	Lydd.
Austin, Lieut.-Colonel H. W.	Fort Stamford.
Baird, Lieut.-Colonel A., M.B., F.R.C.S.Edin.	Worcester.
Barnes, Lieut.-Colonel R. W.	Dorchester.
Battersby, Lieut.-Colonel H. L.	Ipswich.
Beevor, Lieut.-Colonel W. C., C.M.G., M.B.	D.A.D.M.S. North Midland Division Territorial Force, Lichfield.
Bourke, Lieut.-Colonel U. J.	Hamilton.
Browne, Colonel A. L., M.D.	Taunton.
Browne, Lieut.-Colonel A. W.	Armagh.
Burke, Major J. F.	Penally.
Butterworth, Major S.	Carlisle.
Chambers, Major A. J.	Lichfield.
Charlesworth, Lieut.-Colonel H., C.M.G.	Nottingham.
Clements, Lieut.-Colonel W. G.	Christchurch.
Coutts, Lieut.-Colonel G., M.B.	Chichester.

Name.	Station where Employed.
Davoren, Major V. H. W.	Bury St. Edmund's.
Day, Lieut.-Colonel W. B., M.B.	D.A.D.M.S. 2nd London Division Territorial Force, London.
Dowman, Lieut.-Colonel W. S.	Kingston-on-Thames.
Duggan, Major C. W., M.B.	Lincoln.
Duncan, Lieut.-Colonel S. E.	Shrewsbury.
Freeman, Major E. C., M.D.	D.A.D.M.S., East Anglian Division Territorial Force, Warley.
Greig, Lieut.-Colonel F. J.	Stirling.
Gubbin, Lieut.-Colonel G. F.	D.A.D.M.S. 1st London Division Territorial Force, London.
Haywood, Lieut.-Colonel L., M.B.	D.A.D.M.S. South Midland Division Territorial Force, Warwick.
Hodson, Lieut.-Colonel R. D.	Trowbridge.
Hosie, Lieut.-Colonel A., M.D.	Sandown.
Jackson, Major R. W. H., M.D.	Weymouth.
James, Lieut.-Colonel H. E. R., C.B., F.R.C.S.	War Office.
Kay, Lieut.-Colonel A. G., M.B.	Clifton, Bristol.
Kearney, Lieut.-Colonel J., M.D.	Wrexham.
McCormack, Major R. J., M.D.	Omagh.
McCreery, Lieut.-Colonel B. T., M.B., F.R.C.S.I.	Perth.
Mansfield, Major G. S., M.B.	St. Peters, Jersey.
Moir, Major J. D., M.B.	Fort Efford and Mutley District.
Morris, Lieut.-Colonel W. A.	Scarborough.
Mosse, Lieut.-Colonel C. G. D., F.R.C.S.I.	Guernsey.
Myles, Major E. H., M.B.	,,
Nichols, Lieut.-Colonel, F. P., M.B.	Bodmin.
Nicolls, Lieut.-Colonel J. M., M.B.	Detention Barracks, Cork.
Osburne, Lieut.-Colonel J.	Galway.
Peeke, Major H. S.	Derby.
Power, Major R. I.	Waterford.
Poynder, Lieut.-Colonel G. F.	Bedford.
Riordan, Lieut.-Colonel J., M.B.	Clonmel.
Robinson, Surgeon-Lieut.-Colonel G. S.	Eastbourne.
Rowney, Lieut.-Colonel W., M.D.	Manchester.
Scanlan, Lieut.-Colonel A. De C.	Guildford.
Scott, Lieut.-Colonel H., M.B.	Landguard Fort.
Spence, Major A. E. C., M.B.	Warwick.
Thomson, Lieut.-Colonel W. B.	Northampton.
Trewman, Lieut.-Colonel G. T., M.B.	Reading.
Trotter, Major W. J.	Naas.
Tuckey, Lieut.-Colonel T. B. A.	Detention Barracks, York.
Wade, Major G. A., M.D., F.R.C.S.I.	Horfield.
Whitty, Lieut.-Colonel M. J., M.D.	Liverpool.
Wight, Lieut.-Colonel E. O.	D.A.D.M.S. Home Counties Division Territorial Force, Hounslow.
Woods, Lieut.-Colonel C. R., M.D., F.R.C.S.I.	Birr.
Zimmermann, Major B. F.	Lancaster.

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Journal
of the
Royal Army Medical Corps.

Original Communications.

"THE SOLDIER'S HEART."

By COLONEL R. J. S. SIMPSON, C.M.G.

What's this, good doctor, that you say I've got?—
An "intermittent pulse"? Lor! that sounds bad;
But what exactly is it? Kind of dot-
And-carry-one affair? I say, that's sad!
You mean it merely drops a beat or so,
A sort of syncopated pit-a-pat?
But, my dear fellow, surely you must know
That's good old rag-time! Oh, I don't mind *that!*

PUNCH.

(1) Rather more than three years ago, before the United Service's Medical Society, a discussion on "The Soldier's Heart" was opened by Dr. Pembrey and myself,[1] when the results were given of a series of observations on patients sent into the Queen Alexandra Military Hospital diagnosed D.A.H.[2]. Our object then was to ascertain the general symptoms which resulted in this diagnosis, and to find out whether any basic lesion existed.

[1] *Trans. United Services Med. Soc.*, Part I, 1910; and JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xv, p. 712.

[2] D.A.H. is a contraction for Disordered Action of Heart.

(2) Soon after taking over charge of the Medical Division of the Royal Herbert Hospital, it became obvious that a favourable opportunity presented itself for further observations of the same type of disorder. But, instead of limiting observations to those cases which were already marked down as the subjects of cardiac disorder, the opportunity was taken to examine every case which presented symptoms which might possibly be attributed to cardiac disease, functional or organic. Experience soon showed that it was advisable to examine cases of certain acute diseases, especially during their convalescence, and also to pay more attention to other systems of the body than had previously been the case.

(3) As the material has been drawn almost exclusively from the garrison of Woolwich, certain characteristics must be referred to.

(*a*) *The Distribution of the Strength by Age and Service.*—Figures are only available up to 1906, when the strengths ceased to be given under these headings.

Between 1890 and 1906 the distribution of the population was thus:—

By age		By service	
Under 20	326 per mille.	Under 1 year ..	331 per mille.
20—25	363 ,,	1— 2 years	211 ,,
25—30	163 ,,	2— 3 ,, ...	90 ,,
30—35	79 ,,	3— 4 ,, ...	70 ,,
35—40	46 ,,	4— 5 ,, ...	55 ,,
40 and over.. ..	23 ,,	5—10 ,, ...	125 ,,
		10—15 ,, ...	60 ,,
		15—20 ,, ...	40 ,,
		20 and over	18 ,,

That is: 70 per cent were under 25 years of age, and 76 per cent had under five years' service.

There is no reason to believe that any material change has occurred in these proportions, and one may, without much error, take them as representing a standard population. Of the cases to be compared with the strengths, sixteen years' records are concurrent with the strengths, it is only the last six years for which actual strengths are not available. It only remains to add that the age group "Under 20" includes a large proportion of lads from 14 upwards. The total strength of the garrison is rather over 5,000.

(*b*) *Sore Throat and Tonsillitis* are very prevalent: rheumatic fever is also prevalent, but not usually of a severe type.

From these two factors it follows that opportunity is given for studying not only the defects in recruits which originated before enlistment, or developed during their training, but also the after effects of the diseases mentioned.

(4) The Relative Incidence of Organic and Functional Disorders at different Ages and Periods of Service.

(a) *Actuals.*—The following table shows the actual number of invalids from the Woolwich garrison during the period 1890 to 1912 who were discharged with more than three months' service. The number of invalids is a better criterion than the number of admissions; for one thing, all duplicate admissions are eliminated. To complete the record, the number of recruits discharged under three months' service should also be added, but material was not available; few of these cases, if any, have contracted the disability in the Service.

TABLE A.—Invalids from the Woolwich Garrison from 1890 to 1912, both inclusive.

By Age.

	Under 20	20—25	25—30	30—35	35—40	Over 40	Totals
V.D.H.* ..	85	118	39	17	14	1	274
D.A.H. ..	14	35	12	2	3	—	66
Totals ..	99	153	51	19	17	1	340

By Service.

	Under 1	1—2	2—3	3—4	4—5	5—10	10—15	15—20	20 and over	Totals
V.D.H. ..	94	53	31	19	14	28	16	14	5	274
D.A.H. ..	17	14	12	6	5	6	5	1	—	66
Totals ..	111	67	43	25	19	34	21	15	5	340

* V.D.H. is a contraction for Valvular Disease of the Heart.

(b) *Ratios.*—The totals are hardly large enough, especially those of D.A.H., to give accurate results, hence, instead of giving the ratios per mille, it has seemed better to plot out the percentages of strength of the standard population and total cases by periods of service, as has been done in the diagram on page 4. This prevents too much stress being laid on inaccurate numerical ratios.

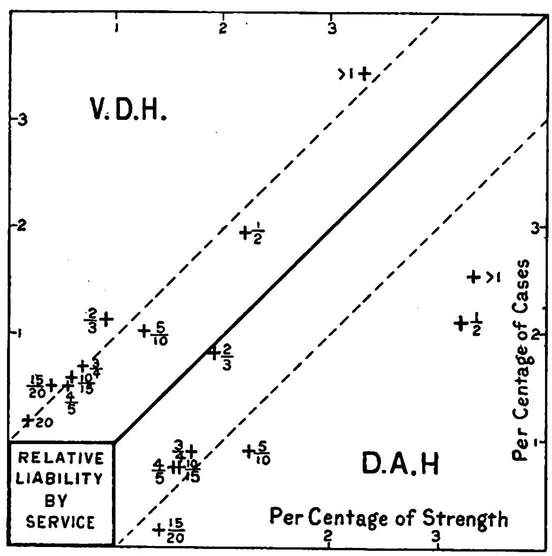
The diagram deals only with periods of service. In each section the dotted diagonal line shows what the incidence would be if there were no selective influence, if each service group was as liable to these disorders as any other. The crosses show the incidence in each group; vertical distance above the base shows the proportion of total cases, horizontal distance from the left margin shows that of total population. Hence crosses above the line show an increased relative incidence; below the line, a decrease.

Dealing first with V.D.H., it is obvious that selective influence is not very marked: in the first quinquennium, the second year of

service shows a smaller and the third a greater incidence than the other years. This last may be purely artificial: as Colonel Melville pointed out, the examination of men for foreign service at this time results in the detection of cases that have previously escaped. The second quinquennium shows a somewhat smaller incidence. But broadly, the figures do not suggest any important selective influence.

If we turn from the invaliding to the mortality, we find different conditions. The following table shows *deaths* against *invalids for V.D.H.*, both by periods of service :—

	Under 1	1—2	2—3	3—4	4—5	5—10	10—15	15—20	20 and over
Invalids ..	94	53	31	19	14	28	16	14	5
Deaths ..	3	1	3	—	1	5	3	5	2
1 in	31	53	10	—	14	5·6	5·3	2·8	2·5



WOOLWICH GARRISON 1890-1913

Here we have a very different picture: after the first quinquennium, the conditions diagnosed as V.D.H. are very much more important than at earlier periods. To complete the record two deaths from pericarditis have to be added to those in the first two years of service, one from malignant endocarditis in the group 5—10, five deaths in the group 15—20, and two in the group over 20, all from aneurism. The probable explanation is that the deaths in the earlier years are the direct and immediate result of acute cardiac disease complicating rheumatic fever, while those at later periods are less immediately related, if at all, to this particular infection.

Returning again to the diagram, D.A.H. shows a marked selective influence. Neglecting cases discharged under three months' service, in the first two years of service it is low, in the third it is definitely higher. The actual number of cases (66) is so small that perhaps that is all that can be said. There is considerable doubt as to the accuracy of the rise shown in the third year, for reasons given above.[1] But the question has to be considered. Two other factors may be effective, the training of the recruit and young soldier, and the influence of acute disease. These will be considered later.

(5) METHOD OF EXAMINATION.

(i) Detailed record of the previous history and of subjective symptoms.

(ii) Record of pulse-rate and accommodation:
(*a*) In bed, after resting some time.
(*b*) Standing.
(*c*) After a smart walk for two minutes.

Pulse recorded for every quarter minute.

(iii) Blood-pressure recorded in the same sequence and at the same time.

(iv) Examination of the cardiac area in the usual way, but auscultation carried out with the patient at rest and also erect.

(v) Radial and jugular tracings taken with Mackenzie's small polygraph.

(vi) In some cases the patient is screened or photographed.

(i) *History.*—Facts to be recorded.

(*a*) Disease.
None.
Acute.
Chronic.
(*b*) Ability to work or play games.
Normal.
Diminished.

A. Before.
B. After enlistment.

It may be said at once that in a good many cases the history shows that the patient has never been able to do a good day's work, and that in a certain number of cases this disability was the direct cause of the patient's enlistment in the hope of finding an easier job. The history is important not only in relation to the

[1] The distribution of over 5,000 cases given by Lieutenant-Colonel R. J. C. Cottell (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. x, pp. 460 *et seq.*) shows much the same features as this local distribution.

causation of the disability from which the patient suffers, but as a help in deciding on the course to be pursued with the more doubtful cases. It also shows that much of the blame laid on the conditions under which the soldier works is unjust, as the disability existed before enlistment.

(ii) *Pulse-rate.*—The impossibility of fixing on a *normal* pulse-rate appears to be now generally recognized, and the tendency is to accept comparatively wide variations from the usual (70) as consistent with perfect health. A standard position, say erect, must be postulated. In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, January, 1907, Major (now Lieutenant-Colonel and Brevet-Colonel) F. Smith, D.S.O., gives pulse-rates for some 98 recruits in three series, which show some peculiarities in distribution.

Pulse-rate	61—70	71—80	81—90	91—100	101—110	111—120	121—130	131 and over
2nd Series ..	1	7	4	2	1	6	1	—
3rd ,, ..	3	10	12	12	3	5	2	4
4th ,, ..	5	8	6	—	1	4	1	—
Totals ..	9	25	22	14	5	15	4	4

Series 2 and 3 were recruits; series 4, recruits after six months' gymnastics.

As far as these figures go they show a preponderance of pulse-rates under 100. They suggest that a pulse-rate not over 100 may, under the conditions under which the recruit is examined, be accepted without any suspicion as to his fitness arising from that one fact. On the other hand, the cases outlined in abstract show that a slow pulse-rate does not exclude either functional or organic disease.

Absolute pulse-rates have been neglected in the series of cases under review, and as a matter of fact pulse-rates over 90 taken at rest have been exceedingly rare. What is much more useful than the actual pulse-rate, and always to be observed, is the degree of accommodation, the variations due to position or exercise, and the rapidity with which the original rate is reverted to. Here, again, it is the relation of the increase to the original rate that is important.[1] A smart walk for two minutes affords a useful standard of work; in some cases it is enough to produce a definite effect on the respiration.

(iii) *Blood-pressure* observations have not been found as important in this series and have been less regularly made.

[1] See Dr. Pembrey, *Trans. United Services Med. Soc.*, Part I, 1910; and JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xv.

(iv) As regards clinical examinations, experience has shown that the primary examination at the inspection room is not infrequently imperfect. The failure to recognize the actual conditions arises usually from the mode of examination. It is not possible to get satisfactory results from the examination of a man erect, probably holding his shirt up, while his muscles are tense and his chest thrown forward. The man must be stripped and, in the first instance, recumbent before either auscultation or percussion can be carried out with any hope of accurate results. Auscultation in the erect position is also necessary, but care must be taken that the man is standing quite loosely, a matter that usually requires some special attention. In the clinical examination in the wards, there is certainly a tendency to rely too much on the results of auscultation and palpation alone, and the area of dullness is not systematically mapped out. Such a procedure must frequently lead to errors. Recent work shows that the real meaning of variations in the area of dullness is not, however, always as obvious as the older teaching led one to believe. Errors are usually in excess, that is, the severity of the case is more often over-estimated than not, except that it is surprising to find so many recruits passed with loud murmurs.

(v) A large collection of radial and jugular tracings has now been accumulated. To get these requires considerable patience and a good deal of time; their measurement also is a slow process. It is possible to obtain a jugular trace in nearly every case; naturally they vary in amplitude, but it is only rarely (even in healthy men) that it is not possible to get a tracing that can be read. From the type of case that has been most under observation it follows that the majority of these traces are broadly normal, the components and rhythm of the curves fall within the normal range; each case, however, is distinctly individual.

Certain precautions have to be taken before the trace can be accepted as valid evidence, and experience seems to show that, like some other methods of diagnosis, this is useful only where the observer has considerable practice in the manipulation of the instrument, and in reading the tracing.

It seems quite clear that all types of functional derangement of the heart's action, however diverse in origin, show one peculiarity in the jugular curve of maximum oscillation, which consists in an exaggeration of all positive and negative waves without any abnormality in the sequence of the components or in the rhythm. These variations in amplitude are quite independent of the

pulse-rate, and the condition is not associated with a similar exaggeration in the radial pulse curve; on the contrary, the radial pulse is more inclined to show only small oscillations as it tends to be small in volume, and care must be taken that the pressure on the vessels is not too great. In relation to the occurrence of these large pressure variations in the jugular trace, attention may be called to the article by Dr. A. M. Gossage (*Proceedings of the Royal Society of Medicine*, vol. i, Medical Section, p. 253) on "The Tone of Cardiac Muscle." He points out that in a dilated heart where relaxation is obviously greater than in the normal, excitability is increased, manifested by the increased pulse-rate, and contractility is also probably increased.

In practice this type of trace has only been found in cases where the symptoms and physical signs would lead to a diagnosis of functional derangement only, and if the observer has sufficient confidence in the accuracy of his results, it would appear to be a useful indication of the actual conditions.

Respiratory effects (sinus arrhythmia) may be so prominent as to necessitate a separate respiratory trace for comparison before forming an opinion.

It is, of course, not usually possible in our hospitals to make pressure observations or take tracings. But, however interesting these may be in relation to the true nature of the condition, they are not necessary for accurate diagnosis. Careful clinical examination on the lines indicated, together with a detailed history, will give quite enough information to enable an accurate diagnosis to be made. (See "Clinical Disorders of the Heart Beat," Dr. T. Lewis.)

Experience lasting now over five years has shown that the diagnosis of functional derangement is not to be made in a few minutes; a casual examination on one occasion will not permit of any opinion of value being formed as to the condition, and still less as to the causation.

(vi) X-ray examination with the screen is particularly useful in those cases where it is difficult to recognize the left border by percussion. It also reveals any tilting of the heart, and in thin chests the whole process of contraction of the different chambers can be observed.

(6) Symptoms.

There are three ways in which a man arrives in the hospital ward: (i) He reports sick of his own initiative; (ii) he is sent

sick from his unit because he is not able to carry out the prescribed exercises; (iii) some disability is discovered at medical inspection. These three modes correspond roughly to the degree of severity of the symptoms, but the first two overlap to some extent, as one man will try to carry on in spite of symptoms which send another sick at once. Further, young men with murmurs and perhaps some enlargement do not report sick; practically all the cases seen have been detected at some medical examination, that is, they have no symptoms.

(i) The man who reports sick of his own initiative usually complains of dyspnœa on exertion (almost universally), of "pain in the chest" (not frequent), or "round the heart" (more common). There is a distinction between these two sets of pains. "*Pain in the chest*" is not infrequently over the left upper lobe of the lung, or spreading downwards from above the left clavicle. The other common site is at the xiphoid notch, on the left side.

The etiology of these pains is obscure, but they are not always connected with any cardiac condition. Some are certainly associated with a slight bronchitis, others with dyspepsia. Somewhat late in the series of observations it was found necessary to pay considerable attention to chest expansion, and it was found that these pains in the chest were frequent in cases where chest expansion was difficult and deficient. It is quite possible that in some cases they are simply due to unaccustomed exercise.

Pains round the heart are described by Max Herz as distinctive of a cardiac neurosis (see later). In no case have they been found of any severity: they appear to be rather sensations of discomfort than actual pain. They do not keep the patient awake, and bear no constant relation to exercise: sometimes they are relieved, sometimes exaggerated; occasionally they are more distinct after food. They are more frequent in the cases of persistent functional derangement than in the milder type, and do not occur in the cases with loud murmurs which we call V.D.H. One man complained of a stabbing, stitch-like pain over the apex; in another there was, according to the patient's statements, a pseudo-angina. *Dyspnœa on exertion* is the most important symptom, both from its frequency, and as throwing some light on the etiology of certain conditions. We are now obsessed by the one idea of D.A.H., and so when a man complains of dyspnœa on exertion with a rapid pulse, we are inclined to the conclusion that the case is certainly of cardiac origin. But as a matter of fact, in many of these cases, if examined generally, it will be found that the upper part of the

chest is flat, almost immobile, with very limited expansion and deficient air entry. It is very difficult to get these men to fill their chests, they do not appear to have learned to breathe. Prof. A. Keith has shown ("Further Advances in Physiology") that the mechanism of respiration as affecting the upper lobes is quite different from that in the lower lobes: the five upper ribs are alone concerned in the former. It is then doubtful how far the expansion, as measured by the usual method, is any indication of the expansion over the upper lobes. In many cases there is fairly free movement of the lower thorax in spite of the rigidity of the upper part.

Now in some of these cases, this deficient expansion has been found to be associated with chronic nasal obstruction, and there is no reasonable doubt that the same condition existed in others of the same type, though it was not definitely proved. Here, of course, the dyspnœa is primary and respiratory in origin, the cardiac symptoms are secondary. One has also to exclude early cases of tubercle, and cases of a chronic fibroid condition of the apex.

In the more persistent cases, dyspnœa is not constant: it varies from time to time like the cardiac symptoms generally. It appears to be commoner after doubling than after any other form of exercise, an example of the rule that different forms of exertion have varying results on respiration and cardiac action. It may also follow a mental, or rather psychical stimulus without physical exertion.

Sighing respiration is not infrequent, but the "catch of the breath" described by Herz has only been observed in a few cases.

(ii) The man sent from his unit presents symptoms much of the same type, but on the whole less severe. Cases of fainting, on or off parade, also arrive in this way: they are of a different type.

(iii) The man sent from medical inspection is in many ways more interesting. He may have been under observation on account of the type of symptoms in (i) and (ii), or he may have been detected at a routine examination without having made any complaint of disability, or without being aware that anything was abnormal in his condition. It is among these men that what we are accustomed to call serious organic disease is found. Here, of course, are excluded cases subsequent to recent rheumatic fever, or among older men with failing hearts.

(7) The classification of cases by symptoms is almost impossible, and no accurate division is possible. But there are two main groups distinguished by their response to treatment.

Types of Irritable Hearts.

(*A*) *Those which respond to treatment.*

(i) Within a few days.

(ii) Within, say, three weeks.

(*B*) *Those which do not respond.*

(iii) Apparently permanent, but without obvious organic lesion.

(iv) Where some organic lesion exists.

(*A*) (i) These are cases, nearly always in lads of short service, of a purely temporary disturbance, usually in the direction of excited action alone, with loud sounds but without any other symptoms. Accommodation is good, and the jugular tracing is normal in rhythm and composition, though the pressure variations are usually exaggerated till the excited action has ceased. Sinus arrhythmia is common when the pulse slows down. These cases do not return to hospital. It is generally impossible to form any accurate idea of the cause; the history is usually good. Probably they are due to slight overstrain, and it must be remembered that between the ages of 14 and 21 the heart responds to very slight stimuli.

It is now recognized that full *cardiac*, in proportion to *bodily*, development may not be complete before 20 years of age, and that in some cases the heart remains permanently small. The whole of the later work on the heart shows that the standard measurements which have been accepted for diagnostic purposes are in fact extremely variable, especially during adolescence. These physical variations can be met by careful management of each recruit during his training according to his capacity, a method which is now carried out at the better depots, and should be universal. It is also possible that the general effects of the change from civil to military life may play a part in the production of these conditions. One is apt to overlook the magnitude of this change. Two most important elements are the coming under discipline and the increased food, both most marked among the poorer classes.

(*A*) (ii) In these cases the symptoms are more marked; cardiac excitability is very distinct and more persistent; accommodation is not good. Dyspnœa may appear after a short walk. There may also be some dilatation of the left ventricle, with perhaps a soft blowing systolic murmur, which is either completely limited to the region of the apex beat (which may be diffused), or may be over the base, or again soft murmurs may appear at one valve after

another in quick succession on consecutive days. Most of these symptoms are included by Dr. James Mackenzie among the "Manifestations of a Healthy Heart in the Young frequently taken as Indications for Treatment" (*British Medical Journal*, December 21, 1912, p. 1697). The jugular trace shows well-marked pressure variations; sinus arrhythmia is common with the less rapid pulse-rate, and the radial trace may be small and indefinite in outline in the worst cases. Vasomotor symptoms are not infrequently prominent.

In this group the symptoms vary greatly in severity, and in the worst cases it is difficult to form a very decided opinion as to their ultimate fitness for service. The degree of response to treatment is, of course, most important, but the decisive element seems to be the history. If this shows an inability for steady work or for active games prior to enlistment (it is possible to distinguish between a disinclination and a disability), or if the patient has been sent back to duty and the symptoms return, it hardly seems worth while retaining him in the Service. This group merges at its greatest severity into group *B*.

This type is not at all uncommon during convalescence from tonsillitis and influenza, or even sore throat. There appears to be no relation between the severity of the original disease and of the consequent condition. Among invalids from abroad suffering from the effects of malaria, enteric, and especially Malta fever, disturbances of this type are not at all uncommon. But they do not then merit a special designation. It is also quite easy to produce this condition by retaining a patient in hospital on a full diet without exercise or effective distraction. More attention should be paid to the convalescence after sore throat and tonsillitis. A young recruit is hardly fit for his duties immediately after resolution of the local affection.

(*B*) (iii) Cases without obvious cardiac lesion which do not respond to treatment. In this group, though the cardiac condition is always present, the patient perhaps less frequently complains of pains in the chest and dyspnœa as predominant symptoms. As a rule he complains more of inability to do his work, of fatigue after slight exertion, and sometimes of palpitation. Giddiness or a feeling of faintness is occasionally present, but an actual faint has not been recorded. A careful examination into his previous history shows that he has, in nearly every case, never been able to continue at any work involving long hours or considerable bodily or mental strain. Often he has tried several kinds of work without any

improvement. He has given up any exercise he may have taken, or has never been able for it. The majority of these cases happen to have been in town-bred lads, but the same condition has been found among ploughmen, farm and other rural labourers. It is in this group almost without exception that the cases of irritable heart among the older men are found, and in some instances a definite beginning can be found, usually subsequent to harassing or excessive work.

In the observations made with Dr. Pembrey this type of case was dealt with, and, as was pointed out before the United Services Medical Society, there are certain typical symptoms which are predominantly vasomotor in origin. The variability in the pulse-rate and blood-pressure is also seen in the radial and jugular traces, but the actual shape of the wave does not repeat itself with that exactness from day to day which is found in the less severe cases; it is much more influenced by temporary, often psychical conditions, as seen very distinctly in one case where the patient was much affected by the sudden death of a patient in the same ward. It is in these cases that there is most variation in the symptoms from day to day; dyspnœa may be produced on one occasion by exercise that on another leaves the respiration normal; murmurs appear at the various valves and disappear with equal rapidity; there may be a dilatation of the left ventricle of short duration. Similarly the associated symptoms vary in intensity with equal frequency and irregularity.

In cases of this type the cardiac symptoms are only part of the general condition of nervous irritability, a condition which can be shown in many cases to have existed at least since the school age, and in others has first manifested itself where circumstances have depreciated the general health. In the older cases it is worth noting that bad teeth and extreme oral sepsis are usually to be observed.

This group of cases, not very large, is then incorrectly included among cardiac affections. They belong to the "X" disease of Dr. Mackenzie, perhaps more commonly termed neurasthenia. There are many references to these "cardiac neuroses." Max Herz (*Wien. med. Woch.*, May 5, 1910) speaking of patients of 14 to 21 years of age, describes these cases as "phrenocardia," and points out that they depend on physical and psychical causes. Again (*Wien. klin. Woch.*, No. 37) he calls attention to *difficult*, not *rapid*, respiration in these cases (due to hypertonus of the diaphragm) with sighing and a "catch in the breath," as

characteristic of "a sexual cardiac neurosis." Leo Hess (*Wien. med. Woch.*, No. 27, 1911) points out that there are two types of cardiac neurosis, one recurrent during the course of any other neurosis, the other in which cardiac symptoms predominate and are persistent for years either at regular intervals or after exertion or excitement. These date back from childhood, or more frequently from between 15 to 20 years of age. Here, he states, there is a predisposition on the part of the heart and vasomotor system associated with late, or under development of the cardiac apparatus.

In English medical literature, on this question of neurosis, one may refer to Sir William Osler's "Medicine" among the text-books, and to much that has appeared in the medical periodicals. One may, indeed, go back to Sir Thomas Watson, who, in his "Lectures on Physic" (Second Edition, 1845, vol. ii, p. 240), gives a very definite opinion that palpitation and irregularity may be mere functional disorders: "that they depend upon a peculiar and highly sensitive condition of the nervous system" . . . . "dependent, in general, upon a particular state of the vascular system."

All these cases require careful observation, not only as regards the nervous symptoms, but as regards the possible existence of true organic disease. Case 34 (among the Abstracts) is an example of this possibility. Among older men, nervous symptoms are not infrequently the earliest manifestation of organic disease.

In all these cases, the remote origin is an inherited neuropathic tendency; the determining cause may be strain, overwork, and other exhausting influences.

B (iv) Cases with supposed organic lesions.

Little need be said about these cases. The custom is to invalid men having murmurs, irrespective of the condition of the heart muscle, or the state of the ventricles. This naturally exaggerates the incidence of heart disease among soldiers, but the procedure is perhaps justifiable on the grounds that with a small army, there must be no suspicion of the fitness of every man; it, however, necessitates the rejection of men apparently capable of undergoing any exertion.

Here we are practically following the teaching of the older textbooks, whose formula is almost invariably murmur = disease, or at least, murmur plus dullness (greater than our standard) = disease. Our practice does not in fact differ from that which has obtained in civil life, but it has a definite result, either the rejection of a candidate or the invaliding of a soldier, and attention is therefore

directed to these results. The only civil equivalents to these two are the rejection of an applicant for life insurance, or the weighting of the policy, and the rejection of candidates for certain services, and these results are seldom published. It would be interesting to know how many candidates rejected, or men invalided, on the grounds given above would be accepted by insurance companies as healthy lives. So far, it does not appear that modern doctrines have materially influenced the practice of the medical officers of insurance companies.

One point needs special mention, the disposal of men after an attack of rheumatic fever. It is now generally accepted that the cardiac muscle is involved in every attack of rheumatic fever, and indeed that in the young, a myocardial affection may occur without any marked symptom of rheumatic infection, perhaps only a temporary joint pain, growing pains, or a simple sore throat. In nearly all the cases of rheumatic fever observed here, dilatation occurred with a soft mitral murmur. The same was seen in a few cases of tonsillitis. In a good many of these cases, the condition clears up during early convalescence, and the patient is supposed to have made a good recovery. In a good many cases where this happy event did not occur, some patients otherwise in good health were ordered regular but graduated exercise while still in hospital; others were discharged to light work while reporting themselves periodically for examination. The result has been sufficiently good to suggest that it is worth while adopting some system of light work and supervision for these cases with residual symptoms, for a period sufficient to show whether they improve or not. In this way it is possible to save men who are now lost to the Service. Cases of definite endocarditis stand on a different footing.

(8) Notes on some Symptoms.

During the last three years it has been possible to form some opinion on the views of the medical officers who first of all see these cases. Few seem to have any very definite ideas as to what constitutes an irregular pulse, or of its importance.

(*a*) Of the four common forms of irregular pulse, pulsus alternans has not been observed at all; that of auricular fibrillation only in one old civilian, not in Government employment. Those seen were (i) sinus arrhythmia, and (ii) extrasystoles.

(i) Sinus arrhythmia, or the "youthful variation" (Mackenzie), a variation in the length of diastole or in the amplitude of the

beats, usually associated with respiration, though not with any definite phase, can hardly be called pathological. It has been observed by Lieutenant-Colonel Deane in trained athletes (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. viii).

Dr. Mackenzie ("Diseases of the Heart") states that he has seen it in a considerable number of healthy individuals as well as in cases of "X" disease, and points out that after febrile conditions, especially in the young after recovery from rheumatic fever, it is of good omen, as it is never found where there is exhaustion of the heart muscle. Generally speaking, it is now accepted as a physiological phenomenon. It has been found frequently among the cases under review, and is common among young patients in hospital. Stress is laid here on this condition because experience has shown that it is frequently the only thing to be made out in patients sent up for irregular pulse. Its observation is therefore easy, and its nature should be recognized.

(ii) Extrasystoles: An occasional intercalated beat, often perceptible at the wrist, and always by auscultation. It is by no means uncommon, and of itself is of no significance. Dr. Lewis, however, points out that such irregularities should not be entirely neglected: that the case should be seen from time to time. It is most frequent in people in good health who never suffer from heart failure (Mackenzie). It can be produced with some regularity by recurrent dyspepsia, an involuntary experiment well described by Sir Thomas Watson in his "Lectures on Physic" (*loc. cit.*). Sometimes the subject is unaware of the abnormality. It has not been frequently observed among the younger cases. One interesting case, an old syphilitic patient with arteriosclerosis and tabes, showed persistent extrasystoles occurring every fourth beat, but disappearing when the pulse-rate rose as the result of large doses of potassium iodide. One senior N.C.O. was sent up for irregular pulse, which proved to be due to persistent extrasystoles, but nothing could be found wrong with his cardiac or arterial system. A third case is No. 33 in the Abstracts.

Dropped beats: Partial heart block has only been seen in one or two cases of acute rheumatism, where it was also measured in the jugular trace. It has also been noticed in at least one case of influenza during convalescence, but this was not confirmed by a jugular tracing.

(*b*) Fainting: Cases of fainting once or twice, usually in the morning, are not at all uncommon among lads. All the cases were carefully examined; none had any signs of even functional

disturbance. Heat, hunger, or overeating account for most of these cases.

Where there is a history of repeated attacks of fainting, often from boyhood, the case is different. In three cases the clinical history pointed to *petit mal*, and in two of these cases the signs of nervous instability, cardiac and general, were very marked. In one other case, the patient always fainted after any slight injury. In relation to these cases of repeated fainting fits, and indeed to the whole question of cardiac neurosis, attention is directed to an article by Dr. A. E. Russell (*Proceedings of the Royal Society of Medicine*, vol. i, Medical Section, p. 72) on the "Pathology of Epilepsy." He refers to "the hypersensitive vasomotor and cardio-regulatory apparatus" so characteristic of the worst type of functional irregularity, and to the importance of the condition of the skin and splanchnic area in relation to the circulation. The whole paper is extremely suggestive in relation to these functional derangements.

The "feeling of faintness" so often complained of by cases of the neurotic type appears to be definitely associated with some modification of the heart's action, but this change probably only expresses one result of the nervous strain which is expressed as a feeling of faintness. It was possible in one case to take a continuous trace from the apex beat (with the ink-writing polygraph), the patient standing up, while he became more and more tremulous, with cold and clammy hands, till he was compelled to sit down. The changes in rhythm and amplitude are very marked. The same thing has occurred in extreme cases while the patient was recumbent in bed. If one wishes to get the normal trace in such cases very careful handling is necessary; they must be physically and mentally at rest, and it is usually only after several attempts that a trace which may be accepted as characteristic can be obtained.

(9) Abstracts of Cases.

These cases have been selected as representative and classified as far as possible by the predominant symptoms. But it will be seen that the three common symptoms, præcordial pain, dyspnœa, and excited action of the heart, occur in cases of very different history and arise under very varying conditions; this arrangement is therefore only for convenience. Cases of trivial temporary disturbances have not been included. The first words always show what symptoms the patient complained of, except where he was sent up after a routine medical examination.

(a) Pain in the Left Chest or "Around the Heart."

No. 1, aged 18. Service, three months. Pain of two weeks' duration, not felt before, in left chest over lower ribs. Active life, no illnesses. P. 75, with marked sinus variation. Early dyspnœa on doubling. Sounds loud and pure. Discharged to duty, N. A. D. (no appreciable disease), but reported sick again four days later with pain as before. Probably dyspeptic, and certainly very nervous about his heart, as his mother suffers from some cardiac disease. To duty.

No. 2, aged 18 years 9 months. Service, five months. Pain at edge of left lower costal cartilages. Heavy work since age of 14. No illnesses. Smokes a good deal. P. 66, B.P. 123 mm. at rest; P. 67, B.P. 115 mm. after two minutes' walk. Heart is absolutely normal. One of the two cases in which tobacco seemed to be a factor in production. To duty.

No. 3, aged 18. Five weeks' service. "Pains round the heart." Has not done any drill nor gymnastics. Has *had the pain since he fell off a roof four months ago.* P. 76, B.P. 124. Hands blue and mottled, stomach dilated. Returned to duty.

No. 4, aged 19. Service, one month. Pain round the heart. Had rheumatic fever about three years ago, severe, no recurrence. Fairly hard work. *Had precordial pain and palpitation before enlistment and before his attack of rheumatic fever,* but not enough to stop his working. Has done gymnastics. P. 61, accommodation good, B.P. 130 mm. An occasional extrasystole. Cardiac impulse and first sound forcible. Hands blue and cold. Vasomotor type. To duty: has not returned to hospital.

No. 5, aged 22. Service, one year nine months, plough boy. *Could not complete a row without a rest on account of pain about the heart, therefore enlisted.* Had also to give up football.

26.11.10	Pulse.	Recumbent	23.21.20.20 = 84.	B.P., 132 mm.
		Erect	28.29.28.29 = 114.	,, 115 ,,
		Walked only twice round the ward.		? not countable.
10.12.10	Pulse.	Recumbent	19.19.19.19 = 76.	B.P., 128 mm.
		Erect	22.25.22.22 = 91.	,, 122 ,,
		Two minutes' walk ..	27.26.25.23 = 101.	,, 120 ,,
		With a tight binder round the abdomen.		
		Recumbent	17.17.16.17 = 67.	B.P., 126 mm.
		Erect	26.27.25.25 = 103.	,, 126 ,,
		Two minutes' walk ..	30.27.26.28 = 111.	,, 120 ,,

After two minutes' walk (26.11.10), severe dyspnœa and flickering pulse, had to lie down. Sighing respiration, hands blue, cold and

clammy. Cardiac condition, no abnormalities. Vasomotor type. Invalided D.A.H.

No. 6, aged 17. Service, two months. Pain over præcordia, *began about six months before enlistment,* worse after playing football. P. 81, accommodation fairly good. Cardiac impulse very broad and forcible: all sounds loud and roughened: sinus variation very marked. Poor physique: showed no improvement. Discharged on Army Form B. 204.

No. 7, aged 19. Service, two months. Pain like the pricking of a needle at the apex lasting about ten minutes after gymnastics, with a feeling of fatigue and palpitation, but no dyspnœa. *In 1906* (five years ago), while in camp as a cadet, *had the same symptoms and was laid up for a week. Chorea* from about 7 to 15. Measles. Active, football, cycling (long distance).

P.	Recumbent	11.10.11.11 = 43.	B.P., 116 mm.
	Erect	17.13.13.14 = 57.	,, 124 ,,
	After two minutes' walk	14.14.13.13 = 54.	,, 122 ,,

Cardiac dullness 3 in. to left of middle line: impulse is broad and heaving. Sinus arrhythmia. A sharp systolic bruit, loudest at the apex, audible over the base and towards the axilla. Showed no improvement. Discharged on Army Form B. 204, largely on the history.

No. 8, aged 19. Service, three months. Pain over left chest running down from above the clavicle. Dyspnœa after gymnastics. Active, no illnesses. P. 71, accommodation good. Apex beat feeble, but first sound rather rough. Dullness normal. Marked sighing respiration: deficient air entry and feeble sounds. Improved and returned to duty.

P.	Recumbent	17.15.16.18 = 66.	B.P., 146 mm.
	Erect	22.16.17.16 = 71.	,, 152 ,,
	Two minutes' walk ..	24.18.17.18 = 77.	,, 150 ,,

No. 9, aged 28. Service, eight years. Pain in the side, "a funny feeling," beginning in the costal arch left side, and emerging over the left clavicle; worse in the early morning and about 6 p.m. Has specially noticed that no difference occurs in the heart's action at these times: no other symptoms. Drill instructor, fairly active. Impulse and sounds forcible, dullness normal; tongue furred and very tremulous: drinks very little and does not smoke. Reflexes increased. Probably not alcoholic. Improved and returned to duty.

(*b*) *Dyspnœa.*

No. 10, aged 20. Service, four months. Dyspnœa for the last three months. Palpitation and dyspnœa worse after doubling.

Rheumatic fever two years ago. Medium work, fairly active, but did not play games. Always fairly well, but not robust; soft and flabby; chest flattened under clavicles. Respirations rather feeble, no accompaniments. Pain at second left costal cartilage on deep inspiration; cardiac dullness left border 4½ in. from middle line, apex beat just inside it distinct, but not forcible. In bed has an apical systolic murmur—soft and not conducted—which disappears when he stands up; reflexes all increased. No improvement. Discharged on Army Form B. 204 (S.R.).

No. 11, aged 19. Service, three months. Dyspnœa, palpitation, debility. *Heavy work before enlistment, suffered from dyspnœa then.* Tonsillitis two years ago. Impulse diffused fourth and fifth spaces; apex beat forcible 4 in. from the middle line, first sound loud and forcible, no bruits, action regular. P. on enlistment 92. One of the few cases in which it was impossible to get a satisfactory jugular tracing. Three admissions with no change. Invalided.

No. 12, aged 19. Service, seven months. Dyspnœa, fatigue, belching of wind on exertion. Not very active, and *the same symptoms before enlistment.*

P.	Sitting	19.18.19.19 = 75.	B.P., 97 mm.
	Two minutes' walk ..	17.16.16.16 = 65.	,, 108 ,,

Respirations, 37. One trace shows five inspirations to six pulse beats. Cardiac dullness small. Chest flattened under the clavicles; expansion small, inspiration and breath sounds feeble; bases of lungs are more resonant than the upper lobes. Major G. A. Moore reported deflection of the nasal septum to the right, enlargement of both inferior turbinates—worse on the right side; enlarged tonsils and adenoids. Is extraordinarily sensitive to touch and flinches under moderate percussion. No improvement. Discharged on Army Form B. 204: "Nasal obstruction."

No. 13, aged 21. Service, four months. Dyspnoea: said to have spat up blood, but this is doubtful. No illnesses, *could never run,* no second wind. A little cough at times. Chest flattened under both clavicles, poor expansion, with deficient air entry; inferior turbinates much enlarged. Cardiac dullness to left nipple line, action rapid and excitable; variable bruits from day to day, not always at the same orifices. Refused operation. Invalided for nasal obstruction.

No. 14, aged 20. Service, two months. Dyspnoea on exertion, pain in left chest (apex). Chest very rigid, slight expansion only, and a general depreciation of the percussion note over the left upper lobe anteriorly and posteriorly, with feebleness of breath sounds. Pain about apex beat, dullness normal; sounds are forcible but pure,

the first at the apex is accompanied by a peculiarly sharp sound varying in intensity, of the nature of a rub and probably pleuritic. Discharged, Army Form B. 204: "Inflammation of lung."

No. 15, aged 17. Service, three years. Pain over the præcordia with dyspnœa; repeated attacks of bronchitis when a child; diphtheria at ten years of age, a good many attacks of sore throat and tonsillitis; symptoms come on after walking; is unable to blow a long trumpet call. On joining battery was well till he had to groom his horse. Left cardiac dullness $3\frac{3}{4}$ in. from middle line. Impulse diffuse, maximum in 4th space $\frac{1}{2}$ in. internal to nipple. Sounds are loud but pure; harsh breathing at left apex. P. 70, accommodation good. Returned to duty after ten days in hospital; two months after admission the pain had almost gone and he could blow better, the chest had cleared up.

No. 16, aged 18. Service, two months. Pain in the left side of chest passing from under the clavicle through the nipple to about the apex: only on walking quickly or after gymnastics. No illnesses. Not active, gave up cycling on account of *the pain, which first appeared when he began to take long walks.* Began to smoke at 17 years of age, but *the symptoms existed* before that.

P.	Recumbent	16.16.15.15 = 62.	B.P., 112 mm.
	Erect	19.15.14.15 = 63.	,, 118 ,,
	Two minutes' walk ..	16.15.14.15 = 60.	,, 122 ,,

Some dyspnœa; cardiac dullness and sounds normal. There is prolonged expiration above the left scapula with diminished V.R. and V.F. Blood count, r.b.c. 4,880,000; white, 8,800; Hb., 90 per cent. Returned to duty.

No. 17, aged 21. Service, two months. Dyspnœa, no pain in chest. Was in Great Ormond Street, aged 12, (?) paralysis. No other illness. Active; dyspnœa noticed when he began to double; sinus variation marked. P. 11.12.13.13 = 49 in bed. Dullness left nipple line, apex beat $\frac{3}{4}$ in. inside it, rather diffuse. A mitral systolic at the apex, conducted to the axilla. Discharged, Army Form B. 204.

(c) *Fainting.*

No. 18, aged 22. Service, one year and seven months. Fainted on two occasions when under treatment for tonsillitis. Cardiac conditions absolutely normal. Duty.

No. 19, aged $18\frac{1}{2}$. Service, two months. Fainted on parade. P. 18.19.19.19 = 75. Cardiac condition normal. Returned to duty. Three weeks later he was readmitted with acute articular rheumatism and developed endocarditis. Was there any toxic affection of the myocardium at the time of his fainting?

No. 20, aged 24. Service, three years and six months. Faints after slight injuries. Feels done up after his day's work.

P.	Recumbent	16.17.16.16 = 65.	B.P., 138 mm.
	Erect	19.17.18.19 = 73.	,, 135 ,,
	Two minutes' walk ..	21.20.21.19 = 81.	,, 135 ,,

Cardiac conditions are normal; hands blue, cold, and rather clammy. To duty.

No. 21, aged 16 years 5 months. Service, one year and three months. Fainted at his work. History of a "fit" of the same kind five years ago when at school. Not subject to headaches. Rather dull expression.

P.	Recumbent	19.19.19.20 = 77.	B.P., 122 mm.
	Erect	24.19.20.19 = 82.	,, 130 ,,
	Two minutes' walk ..	20.18.18.18 = 74.	,, 105 ,,

Note the fall in pulse-rate and B.P. after exercise, characteristic of the vasomotor type. Returned to duty.

No. 22, aged 19. Service, two months. "Pain round the heart." Before or about 14 he began to have "fits." Had two while at school; about 16 was "ill," suffering from fainting fits. The last three or four years they have been more frequent; every two to three days he feels a little giddy, but "goes off" only about once a fortnight. Feels a little dazed and giddy and then becomes unconscious. Sometimes has heavy sweats without fainting; once or twice has passed urine during the attacks; no struggling. Has been under observation by a medical man for the last two and a half years, the last year definitely on account of the "fits." P. 81; B.P. 140 mm. Hands moist. Heart sounds are rough, but otherwise there is no abnormality. Discharged on Army Form B. 204, epilepsy.

No. 23, aged 19. Service, six months. Two faints since arrival at depôt. Subject to "fainting attacks" since age of 12, as many as two a week, not at night. No aura, no bitten tongue. Frequent illnesses, pleurisy at 13, catches cold easily. Family history bad: father, aged 66, has "fits," mostly on one side: mother has heart trouble: two brothers and one sister ill, one sister dead; two brothers and one sister well. P. on enlistment 90.

P.	Sitting	20.20.21.20 = 81.	B.P., 135 mm.
	Two minutes' walk	26.24.24.24 = 98.	,, 138 ,,

Invalided, epilepsy.

No. 24, aged 20. Service, one month. Giddiness, pain in side and chest; could not "get his breath." Rheumatic fever five to six

months ago. "Hysterics" two or three times with dizziness and loss of consciousness, especially after overwork. Had to give up smoking on account of these attacks. First attack about time of leaving school. Eyes get dim, head goes round, loses consciousness: sometimes bites his tongue: has urinated during the attack once or twice. Was returned to duty for about a week and re-admitted with the same symptoms. No cardiac abnormality. After the sudden death of a patient in the ward he had a sharp attack of tachycardia at 2 a.m. with a feeling of want of air, felt light-headed and dry at throat. Heart sounds rather faint, a very faint blowing systolic at the apex, no alteration in dullness. Discharged on Army Form B. 204, epilepsy.

(Note.—With the exception of No. 19, all the cases under this heading were definitely of the vasomotor type referred to by Dr. A. E. Russell in the article already mentioned. The last three were definitely epileptic, but without the history the true explanation would have been overlooked.)

(*d*) *Cases Showing a Marked Nervous Element.*

No. 25, aged 40. Service, fifteen years two months. Palpitation detected at examination for foreign service. Very tremulous, hands cold and clammy, pulse small, and tracings only obtained with difficulty owing to the tremor. India 1897-1907: malarial fever, no venereal. Much run down after cholera camp Mian Mir, 1903; had the same palpitation, which passed off and recurs when he gets run down. An irregular drinker, has a bout of a week or so from time to time. An old man for his years. P. 20.21.21.21 = 83; B.P. 165 mm. Vessels are rather hard: apex beat not well marked, situated in the nipple line just inside the left margin of dullness. Occasionally a trace of albumen in the urine. The radial trace is persistently flat topped. There is definite arteriosclerosis, and probably some neurosis also. To duty.

No. 26, aged 24. Service, five years. Inability to work; jumpy. No foreign service. No palpitation, sleeps well, appetite failed.

P.	Recumbent	43.40 = 83.	B.P., 125 mm.
	Erect	43.42 = 85.	,, 125 ,,
	Two minutes' walk ..	51.45 = 96.	,, 128 ,,

No cardiac abnormality. Anæmic. Hands very cold and trembling. Reflexes not exaggerated. Improved rapidly and returned to duty.

No. 27, aged 22. Service eight months. An officer. General malaise, fatigue, abdominal discomfort. Enteric fever two years

ago: overworked lately. Cardiac dullness ¾ in. outside nipple line: a faint systolic murmur limited to the apex. Pulse rapid and very soft. Very nervous, reflexes increased. Improved with rest and sent on sick leave. Seen twice since, dullness in nipple line and no murmur, but general nervousness and all the stigmata of a neurasthenic remain. Duty.

No. 28, aged 19. Service, *one week*. Admitted with pleurisy. *As a youth was not fit for heavy work on account of weakness and dyspnœa*. Later was a tram conductor. Joined Special Reserve in 1909 and had no trouble with his wind.

P.	Recumbent	40.41 = 81.	B.P., 135 mm.
	Erect	45.46 = 91.	,, 140 ,,
	Two minutes' walk ..	46.46 = 92.	,, 140 ,,

Cardiac conditions normal: marked cardio-inspiratory systolic at apex. Hands blue and cold, feet also. Improved: to duty.

No. 29, aged 20. Service, two years six months. Sudden onset of dyspnœa when on furlough, indefinite pain, "could hardly breathe." Heavy work before enlistment; sore throat twice two and a half years ago. Apex beat localized fifth space: left dullness in nipple line. Respiration shallow, left apex does not expand well. Reflexes much increased. Improved greatly and returned to duty.

(*e*) *Old-standing D.A.H.*

No. 30, aged 30. Service, twelve years, is a N.C.O. Giddiness, pain over præcordia, and (very doubtfully) radiating into the left arm. His Medical History Sheet shows the following admissions:—

1908	7 days	19 days	9 days	D.A.H.
1909	7 ,,	11 ,,	...	,,
1910	17 ,,	...	...	Anæmia.
1911	3 ,,	? days	...	D.A.H.,

i.e., 8 previous admissions.

On admission he was under detention for absence without leave. Cardiac action excited: localized systolic murmur at the apex: dullness normal. Considerable general excitement probably due to alcohol. Pulse 74. Inquiry about pain said to radiate to left arm left great doubt as to its reality; there was no hyperæsthetic skin area. After various incidents unusual in the career of a N.C.O., he arrived again at hospital in the same excited condition. Pulse 104, but less in his quiet periods. He professes to be ignorant of recent occurrences. His Corps history shows great

variability in conduct from time to time. A man of marked intelligence, without any moral sense, with mental and cardiac instability. Invalided.

No. 31, aged 23. Service, eight years three months. Admitted with bronchitis. No illnesses, light work before enlistment. Rejected (he says) three or four times for foreign service on account of palpitation. Rejection on account of D.A.H. recorded twice on his M.H.S. States he is very nervous: does not like to be alone, has been so since childhood. Very fastidious about food, rarely eats breakfast, and is easily put off his meals. No claustrophobia. Sleeps well as a rule. No pain, no headache. Smokes a little, but does not drink. Does not feel any palpitation except temporarily when he gets excited.

P.	Sitting	23.24.24.23 = 94.	B.P., 108 mm.
	Two minutes' walk ..	23.22.22.23 = 90.	„ 112 „

No cardiac abnormality. Poor physique. Returned to duty. Examined again.

P.	Sitting	19.18.19.18 = 74.
	Two minutes' walk ..	23.23.19.20 = 84.

Marked improvement.

No. 32, aged 23. Service, seven years seven months. Rejected on examination for foreign service. M.H.S. shows the following entries:—

Enlisted January, 1903; April to May, 1903, D.A.H. "soft blowing murmur over præcordia." September, 1909, "aortic stenosis with dilatation."

Has been a long distance runner since 1907: third in cross-country race at brigade sports 1909. Recent history: Has been running five to six miles every morning (after some tea and cake) except Saturday and Sunday. Is employed in school about five hours daily. Pulse 23.22.24.23 = 92. B.P. 142 mm. Apex 4½ in. from the middle line, but no visible pulsation there; pulsation visible between left nipple and sternum. Left dullness just outside apex beat. A faint blowing systolic murmur at the apex and over the xiphoid; second accentuated; an occasional extra-systole. Erect, all sounds are loud and accentuated. Reflexes all much exaggerated. Hands blue and cold, very nervous. Later observations.

P.	Recumbent	20.18.17.18 = 73.	B.P., 140 mm.
	Erect	40.41 = 81.	„ 140 „
	Two minutes' walk ..	24.23.21.21 = 89.	„ 138 „

Again—

P.	Recumbent	18.17.18.18 = 70.	B.P., 130 mm.
	Erect	19.19.19.23 = 80.	" 138 "
	Two minutes' walk ..	24.22.21.22 = 89.	" 142 "

Ordered to drop his excessive exercise; returned to duty. Reported on a year later; apex in nipple line, left margin lost in emphysema; no bruit or thrill. Has played a little cricket and hockey, and seems perfectly well.

No. 33, aged 23. Service, four years two months. Præcordial pain, dyspnœa and palpitation on exertion. Attacks like angina by day or night. Irregularity of pulse and weakness and irregularity of heart sounds are recorded on his M.H.S.

M.H.S. Previous entries are for D.A.H. January and February, 1911, July and August, 1912. The traces show persistent extra-systoles about every third beat. They can be felt at the wrist, or heard on auscultation. There are no physical signs of any kind, and the patient appears perfectly healthy. Evidence as to the anginal attacks was hardly convincing, none occurred while he was in the Royal Herbert Hospital. Invalided.

No. 34, aged 23. Service, five years two months. Sudden pain at the heart and throat. Well on rising in the morning: attack came on while at field training; fell out, and pain gradually lessened, finally ceased, but palpitation continued, and has not ceased since: the heart steadies down but goes off again. Hard work before enlistment, diphtheria at age of 5, no other illnesses. Had been working in the gymnasium for amusement every day for about a year and felt quite fit. Thin, but says he has not lost weight. Married off the strength.

P.	Sitting	23.22.22.22 = 89.	B.P., 140 mm.
	Standing	23.23.23.23 = 92.	" 142 "
	Two minutes' walk	27.25.25.24 = 101.	" 146 "

Got very faint after examination and once or twice during the observations, tachycardia came on suddenly, but without any irregularity in the pulse-rate or in the composition of the jugular trace. Apex beat in fifth space in nipple line, diffuse: dullness never beyond nipple line, sounds at first normal. Had the typical general symptoms and the general facies of a vasomotor neurosis very well marked. Very emotional. He improved a little and was sent on sick furlough, but returned to hospital some months later, much worse with a well marked systolic bruit at the apex and some dilatation. The sudden onset is peculiar, as the whole of the symptoms were so characteristic of a cardiac neurosis. The jugular trace,

however, never showed the great pressure variations which seem to be typical of functional disturbances. It is of course common to find a general neurosis beginning with some history of slight injury or strain, and this may have been a case of cardiac strain, though with the history of steady exercise it is not likely.

No. 35, aged 26. Service, two years. An invalid from Mauritius for D.A.H. Reported sick on account of shortness of breath while at rest. Had been twenty-seven days in hospital with gonorrhœa. Felt the symptoms complained at first at Curepipe.

25.8.10.	P. Recumbent	23.22.23.23 = 91.	B.P.,	140 mm.
	Erect	43.40 = 83.	,,	144 ,,
	Two minutes' walk ..	24.22.24.20 = 90.	,,	135 ,,

Marked sinus variation. Dullness and sounds normal. Deep reflexes exaggerated. After five weeks at Eastbourne—

P. Recumbent	14.13.14.14 = 55.	B.P.,	125 mm.
Erect	19.18.18.18 = 73.	,,	130 ,,
Two minutes' walk ..	19.19.20.21 = 79.	,,	136 ,,

Looks much better. Reflexes normal. Duty.

No. 36, aged 23. Service, three years four months. An invalid from Sierra Leone for D.A.H. On arrival at Woolwich was quite well. Duty.

(Nos. 35 and 36 were not cases of D.A.H. but the sequelæ of some acute disease.)

(*f*) *Subsequent to or associated with Sore Throat or Tonsillitis.*

No. 37, aged 20. Service one year two months. Sore throat. Thirteen days after admission—

P. Recumbent	21.21.20.21 = 83.	B.P.,	153 mm.
Erect	25.24.26.26 = 101.	,,	162 ,,
Two minutes' walk ..	28.24.24.25 = 101.	,,	173 ,,

Nervous, and readings probably in excess. Trace shows very large oscillations with over-sharp angles. No special symptoms; history good; did well at gymnasium and in riding school before attack. Recovered; duty.

No. 38, aged 21. Service, four years. Sent up for V.D.H. from routine examination. Two attacks of tonsillitis in 1906-7. No subjective symptoms. Apex beat not visible: is ¼ in. internal to nipple line. Left border of dullness in the nipple line. In bed, a systolic at the apex and strictly limited to it, of a peculiarly leathery twang. After walking upstairs, action rapid, a *faint*

double mitral murmur audible only over the apex beat; excited action quickly passes off and murmurs disappear.

P.	Sitting	22.20.19.19 =	80.
	Erect	28.23.23.23 =	97.
	Two minutes' walk ..	32.27.24.22 =	105.

Deep reflexes much increased; hands blue and cold. Improved greatly and returned to duty.

No. 39, aged 18. Service, five months. Admitted with sore throat. No complaint of any cardiac symptom. Localized systolic murmur at the apex; faint blowing murmurs at tricuspid and base when in bed. None audible when erect. Impulse forcible on first examination and after walking round the ward, but rapidly becomes quieter. Sighing respiration. Reflexes exaggerated, very anæmic. Nervous. Improved very much and returned to duty.

No. 40, aged 23. Service, six months. Tonsillitis, acute, followed by influenza. Four days after its onset, patient's pulse fell to 32—36 *mane*, 36—34 *vespere*. Pain about the sternum, no other symptoms. Next morning P. was 34—44, very variable within these limits. B.P. 110, an occasional extrasystole. The rate gradually increased to 52—54. P. on enlistment 72. The jugular trace was unfortunately not very good. The a—c interval was lengthened, but there was no definite heart block. Invalided later on: the actual condition was not very definite.

No. 41, aged 21. Service, ten months. Acute tonsillitis; second attack within six weeks. Seventeen days after onset, P. 19.19.16.15. = 69. B.P. 125 mm. Nervous.

The chief interest in this case was in the jugular trace, which was of the same type as in No. 38, but with a very deep fall after the ventricular systole and a very slowly filling auricle. Duty.

(*g*) *Cases of V.D.H.*

No. 42, aged 18 years 4 months. Service, three months. Dyspnœa after doubling; detected at gymnasium. No illnesses. Riding boy from 14—17. Physique very good. Has only noticed the dyspnœa for *the last six months*. P. 15.14.12.15 = 56 with three dropped beats. Impulse diffuse over an area 1 in. by ¾ in., maximum below 5th rib, ¾ in. internal to nipple line. Dullness in left nipple line: right edge of sternum. Loud systolic murmur at the apex conducted to axilla and audible over the base; loud systolic murmur over the aortic area conducted up the sternum and into great vessels of neck. Originated before enlistment. Discharged on Army Form B. 204.

No. 43, aged 20. Service, two years. Detected on examination for extension of service. No subjective symptoms. No illnesses. Has not done gymnasium. P., sitting, 17.18.18.17 = 70. P. 2 min. walk, 22.20.18.17 = 77. Shaking a little: no dyspnœa. Impulse wide and heaving ¼ in. outside left nipple: left margin of dullness at same limit. Very loud and rough double aortic murmurs. Invalided.

No. 44, aged 20 years 2 months. Service, one year one month. Detected on examination for Reserve. History of severe exercise of all kinds since he went to school; the last year has been running up to 1½ miles and sprinting up to 220 yards, but has not raced. Has never felt any inconvenience. Measles at 6 years of age. Pulse very rapid; repeated extrasystoles; apex beat distinct ½ in. below nipple, left margin of dullness ill-defined, but not more than ¼ in. outside nipple line; faint systolic at the apex, loud aortic. Invalided.

No. 45, aged 19. Service, *five weeks*. Admitted for constipation. Farm labourer, and has been to sea. Looks well and is of very good physique; no illnesses.

1.7.10.	P.	Recumbent	41.41 = 82.	B.P., 110 mm.
		Erect	45.43 = 88.	,, 110 ,,
		Two minutes' walk ..	42.43 = 85.	,, 120 ,,
2.9.10.	P.	Recumbent	27.28 = 55.	,, 102 ,,
		Erect	33.32 = 65.	,, 105 ,,
		Two minutes' walk ..	30.31 = 61.	,, 110 ,,

Dullness normal; systolic murmur at apex not conducted, systolic murmur in aortic area conducted to the great vessels; no dyspnœa. Returned to duty between July and September, and was doing the whole of his training as a driver, R.F.A., without any difficulty. Finally was invalided, solely because of the fact that he would be rejected at every routine examination that he comes up for. Is to return to work as a sailor.

No. 46, aged 17 years 9 months. Service, *one month*. Sent up by Medical Inspector of Recruits. No illnesses; looks well. Dullness 4 in., apex 5th space, 3 in. to left of middle line; systolic bruit in aortic area conducted to the great vessels; fainter mitral systolic. Discharged on Army Form B. 204.

No. 47, aged 20. Service, *six weeks*. Sent up after routine examination. No symptoms; well marked mitral disease. Discharged on Army Form B. 204.

No. 48, aged 18. Service, *one month*. Sent up by Medical Inspector of Recruits. No symptoms; measles when a child; well marked mitral disease. Discharged on Army Form B. 204.

No. 49, aged 22. Service, *one month*. Detected at examination for gymnasium. No symptoms. *History of heart trouble when a child*, but for years has felt quite well. Well marked mitral disease. Discharged on Army Form B. 204.

(Nos. 42, and 45 to 49, evidently originated before enlistment, but there is no history of definite illness. The following cases have a definite history of rheumatic fever before enlistment.)

No. 50.—Aged 18 years 9 months. Service, *one week*. Detected when up for vaccination. *Rheumatic fever aged* 15 in a children's hospital, and afterwards attended Westminster Hospital for six to seven months for heart trouble. Not active. No symptoms. Well-marked mitral disease. Discharged on Army Form B. 204.

No. 51.—Aged 18 years 3 months. Service, *four days*. Detected at examination on joining station. *Rheumatic fever three to four years ago*. In bed four and a half months afterwards at convalescent home. Fairly active; played football regularly. Well-marked mitral disease. Discharged on Army Form B. 204.

No. 52.—Aged 17 years 7 months. Service, *one day*. Detected on joining station. Measles when a child. *Rheumatic fever fifteen months ago:* three weeks in hospital. Has not worked since Well marked mitral disease. Discharged on Army Form B. 204.

No. 53.—Aged 21. Service, *three months*. Admitted with rheumatic fever. *Had an attack of rheumatic fever two years ago*. Has well marked mitral disease. Remains in hospital at date of closing this record.

(Nos. 46 to 52 should not have been enlisted at all: the conditions were perfectly obvious.)

(10) Summary of the Abstracts of Cases.

(*a*) *The Importance of Symptoms :—*

Of cases 1—24: (excluding No. 18) *i.e.*, 23 cases of pain, dyspnœa or fainting, *all reported sick on account of one or other of these symptoms*.

Of cases 25—53 (excluding 35 and 36, invalids) *i.e.*, 27 cases of neuroses, old D.A.H., disturbances associated with tonsillitis, and V.D.H., *only* 6 *reported sick with cardiac symptoms*.

Of 12 cases diagnosed V.D.H. every one was detected at a routine examination or while in hospital for some other reason, and *only in one case* (42) *was there any subjective symptom*.

(*b*) *Time of Appearance of Symptoms :—*

Cases 1—24: 16 appeared before, 8 after enlistment.

Of the 16 appearing before enlistment:—

Nasal obstruction accounted for	2
Fibroid lung	1
Rheumatic fever	2
Epilepsy	3
Frequent illnesses	1
No special illness—	
Vasomotor type 4	7
Others 3	

Of the 8 appearing after enlistment, 1 was of a vasomotor type: 7 presented no special features.

It should, however, be noted that temporary disturbances of short duration, of the nature of overstrain and not recurring, have not been included in the Abstracts.

Cases 25—34. In 5 cases the condition appears to have developed after enlistment: 4 of these cases were, however, of a vasomotor type.

Cases 37—41: 3 of a vasomotor type.

Cases 42—53. V.D.H: 6 cases had the clinical condition so well marked that the origin must have been before enlistment: 3 had one month's service: 2 between one and two months' and 1 had four months': 4 had a definite history of rheumatic fever before enlistment; 2 had no history before enlistment.

That is:—

Of cases 1—24	.. ..	16 originated before enlistment.
,, 25—34	.. ..	5 ,, ,, ,,
,, 35—41	.. ..	—
,, 42—53	.. ..	10 ,, ,, ,,

Of 53 cases then, 31 originated before enlistment. This omits on the one hand the cases of cardiac neurosis occurring after enlistment but really the expression of a constitutional condition. On the other hand, as has been pointed out, the trivial cases have not been included in the list.

(11) Conditions following Rheumatic Fever.

No systematic observations were made on the whole series of cases of rheumatic fever admitted, but it may be said that endocarditis has been an infrequent complication. On the other hand, the usual dilatation, more or less temporary, with a systolic bruit, has been noted in most cases of rheumatic fever, and in some of tonsillitis. Of 11 cases of rheumatic fever in which special notes have been made, a true endocarditis has been noted in 4 cases. Two cases with dilatation, a systolic bruit and dyspnœa were invalided after

prolonged observation. Five cases, in which dilatation and a bruit persisted for some time after the termination of the acute stage, eventually recovered and were sent to duty. They were kept under observation for some time while doing at first only part of their duty; they gradually improved, and were able to resume full work as apparently healthy men.

These numbers are too small to do more than suggest that it is not wise to hasten the invaliding of a trained soldier after an attack of rheumatic fever: time must be allowed for the recovery of the cardiac muscle, and this includes its training for hard work again.

(12) Etiology of the Condition known as D.A.H.

There is sufficient evidence (of which these abstracts give some idea) to show that the symptom complex, pain—dyspnœa, excited or excitable action—may be the expression of very varied conditions, and the elimination of the term D.A.H. from our nomenclature would assist in clearing up the confusion which now exists.

In relation to origin, one may classify the various types somewhat in this way:—

(*a*) *Where there are Mechanical Difficulties in Respiration.*—(1) In the upper air passages: nasal obstruction, adenoids, &c. (2) In the lung: the result of existing or antecedent disease. (3) In the mechanism of respiration: want of muscular development and rigidity of the chest wall. This is perhaps only secondary to the other conditions named in (1) and (2).

(*b*) *The Results of Overstrain of the Cardiac Muscle,* due to its excessive or unwonted use. This is entirely analogous to the results of similar use of any of the skeletal muscles, and is, in the healthy man, no more a pathological condition than the pain and stiffness the recruit suffers from when learning to ride. If proper opportunity for rest is given, the condition passes off, and the heart gradually becomes accustomed to what is demanded of it. The remedy is obvious: it cannot be too strongly impressed on all those concerned with the training of the young soldier that there are great individual differences in cardiac development as well as physical; cardiac development even in a healthy lad may lag behind. Again one recruit differs very much from another in his history; one may have come from a comfortable home where he was well looked after, and well fed, while another may have been out of work and ill fed. The same method of training will not suit both cases.

We are apt to forget that this temporary overstrain is not

confined to the Army; it is common in any congregation of young lads or young men who take up any form of active exercise; schools, colleges, athletic clubs, all produce numerous cases of this temporary disability, and the cause is constant, relatively excessive exercise, with an untrained heart muscle.

Where there is a pre-existing disability, this overstrain may produce a condition which is more or less permanent. These *antecedent conditions* fall into one or other of the following groups:—

(c) *The Rheumatic Group.*—Rheumatic fever has not been found commonly as an antecedent to functional disability. But having regard to the triviality of some of the manifestations of rheumatic infection in the young, we cannot exclude it on the ground that there is no definite history of rheumatic fever. Here the determining factor is some excessive use of the heart muscle which is not entirely healthy, possibly with some residual focal lesions. In this connexion, one may call attention to the discussion on fibrositis (*Proceedings of the Royal Society of Medicine*, vol. vi, Balneological and Climatological Section, pp. 27 *et seq.*), and especially to the remarks by Dr. James Mackenzie on rheumatic affections of the myocardium. He speaks of "heart complaints" "associated with muscular rheumatism, and it was only reasonable to infer that the heart muscle was affected in a manner similar to that affecting the skeletal muscles." The symptoms described by Dr. Mackenzie are of the type met with in our hospitals, but the delay in transmission and partial or complete heart block referred to by Dr. Mackenzie has only been observed in case No. 40, and in acute cases of rheumatic fever.

There is no doubt, however, that the convalescence of a patient who has suffered from even a mild infection of a rheumatic type must be watched, and a gradual progress to full exercise insisted on.

(d) *Neuroses.*—General or special.

(e) *Epilepsy.*

These may be considered together, because they present certain points of similarity.

(i) *Heredity.*—Epilepsy and a (general) neurosis appear to be interchangeable in a diseased stock. Functional heart trouble may be only one symptom of a general neurosis, or may be the sole representative of the hereditary tendency. The age of our cases must be taken into consideration. Except where the neuropathic tendency is well marked, symptoms do not show themselves until the individual is subjected to some physical or mental strain; this

usually first happens about puberty, which coincides in the working class with the time of leaving school. The few years after puberty form a period of great mental instability, and again coincide with the final development of the heart to its adult condition. So that we catch most of our recruits at the time when they are most likely to show signs of the changes going on, and we cannot be surprised that a proportion of them manifest their mental and physical instability by the symptoms which we term D.A.H.

Cases associated with a general neurosis are more common among the older men with greater responsibilities, a longer history of excessive work (which, it may be noted, is usually not physically hard), and, it may be said, with a longer history of oral sepsis and alimentary toxæmia.

(ii) *The Time of Appearance.*—This is the same in both, about the age of puberty.

(iii) *The Vaso-motor and Cardio-regulatory Systems are Unstable.*—The instability of the cardio-regulatory system is very marked in nearly all cases of functional disability, its importance depends largely on the age of the patient. Below twenty, the response to slight stimuli may not always be pathological, and we must then be guided by the condition of the "peripheral heart": alternate asphyxia and congestion, sudden and considerable variations in blood-pressure and especially the effect of exercise. There seems little doubt that in many of the cases, especially where there is a general neurosis, there is considerable arterial spasm; anything which will dilate the capillaries produces a marked improvement in the symptoms for the time being.

Some of the cases abstracted, in which persistent fainting was the prominent symptom, were definitely epileptic. In many of the other cases, the condition was, as has been said already, a neuropathic inheritance, perhaps a mutation in an epileptic stock. It is regretted that special inquiry on this point was not made.

(*f*) *Tobacco.*—Only two cases have come under observation in which tobacco was probably the cause. One was definitely a case of tobacco poisoning, from smoking a very large number of cigarettes within a short time. Some cases may probably have been aggravated by cigarette smoking, and a few observations were made on blood-pressures after smoking, with the usual result, a considerable rise. But it was difficult to eliminate the psychological effect, and part of the rise was probably due to the fact that the lads were the subject of an experiment. It is quite certain that tobacco is not an important element in the production of these

disabilities, and probably it only accentuates the pre-existing disposition to vasomotor irregularity.

(*g*) *Tea.*—Barrack room tea is usually boiled, and sometimes is used to excess ; it may act directly or through an induced dyspepsia. It was the cause of the extrasystoles in the case noted by Sir Thomas Watson (*vide supra*).

Among the older men, syphilis and alcohol are no doubt effective.

(13) Prevention.

If the conclusions as to the etiology arrived at are correct, a large proportion of cases are beyond our control: we are a generation too late. But something may be done.

(i) *Training.*—The present system of physical training as carried out at its best appears to meet all our needs. There is a satisfactory gradation of the exercises, and individual treatment of the recruit.

(ii) *Convalescence after Acute Disease.*—Already referred to.

(iii) *Care of the Teeth and Dental Treatment.*—Oral sepsis appears nowadays to be almost inevitable, but proper care will retard its appearance and delay its progress.

(iv) *Free Respiration and a Healthy Nasopharynx.* — Unfortunately in some of the cases the effects of obstruction on the development of the chest have made it almost impossible to render the recruit efficient.

In practice, it is not possible to eliminate many of these cases at the recruiting office. The true nature of the case cannot be recognized without a careful examination on more than one occasion, and the conditions under which recruiting must be done introduce a very disturbing element. A full examination is rather a slow process, and one must not hustle the patient at all if any satisfactory result is desired.

Prevention has a statistical aspect. Our returns show a prevalence of functional disease far greater than the actual incidence; many cases are diagnosed D.A.H., which on examination show some definite cause for the symptoms. Others are convalescents from acute disease, who should be returned under the head of the original disease.

(14) Prognosis of the Individual Case.

The important question is: how far does the disability affect the man's fitness for service? As a general rule, if the history shows an inability to work; if there are repeated attacks; if there is no

proper response to treatment, then it is not likely that the man will ever be useful as a soldier. But each case needs individual consideration, and it is not always possible to express in words the aggregate of minor indications leading to a decision to invalid a case.

(15) Treatment.

Its aim is the training of the myocardium. It is possible to make two statements as to treatment which apply to nearly all these cases of functional disability: first, that bed is the worst place for them, and secondly, that drugs are of little value in the treatment of the special condition. Patients must of course be in hospital, at least at the beginning, for supervision. The first essential is the treatment of any definite condition, dyspepsia, constipation, oral sepsis, as far as possible, in fact the removal of any source of peripheral irritation, and the improvement of the general health. Following, or associated with this, comes graduated walking exercise. Most of the cases under review were kept in bed twenty-four to forty-eight hours, for examination after a sufficient interval to give a basis for further observations. Then gradual walking exercise, from fifteen minutes twice a day in the worst cases, gradually increasing till the patient could do 5 to 6 miles without difficulty. The effect on the pulse-rate must be watched, and the amount of exercise regulated accordingly, but it is rarely necessary to stop all exercises.

Drugs with a specific cardiac action have not been found necessary, nor in those few cases in which they were used temporarily did any improvement result. While working with Dr. Pembrey at Millbank, several cases of the vasomotor type were given electric baths, and the temperature was raised till the soles of their feet sweated. These certainly did good ; the blood-pressure fell and remained down for twenty-four to thirty-six hours, while the general symptoms were less marked. At the Royal Herbert Hospital, ordinary hot baths were given to several cases. Some improved temporarily, others felt faint and sick afterwards. A case which is likely to do well should show marked improvement after regular exercise for ten days or a fortnight ; most of the slighter cases improve much earlier.

(16) Improvement of Invalids for D.A.H. and V.D.H. after Return to Civil Life.

Attention was called to this point by Lieut.-Col. R. J. C. Cottell (Journal of the Royal Army Medical Corps, vol. x, pp. 460 *et seq.*) in an article which deserves to be read with attention.

Many of the cases invalided as V.D.H. (without a rheumatic history) have more or less persistent murmurs, but no symptoms. They are usually kept in hospital, often in bed, for a comparatively long time, their exercise is limited, they eat well, smoke a good deal, and get completely bored by their surroundings. Finally they appear before an invaliding board, the murmurs probably more distinct than on their first admission. These men do not report sick; they are detected at some routine examination. They are naturally alarmed on hearing they have heart disease, and experience has shown that a man who has been told that there is something the matter with his heart, and that he must be careful, is particularly circumspect in carrying out that recommendation. When the man returns to civil life, after invaliding, he finds he has to work or starve; most of them prefer to work if they can get employment. He is now responsible for all his actions and his needs, and he is not inspected at frequent intervals. He finds soon that he cannot afford to have heart disease, and that, as a matter of fact, it does not make any difference to him. Meanwhile he has been doing hard work, usually as a general labourer, his heart muscle has gained tone and his symptoms have diminished if not entirely passed off.

Shortly, one might say that a good many of our cases of V.D.H. are manufactured out of trivial murmurs by our excessive care, and the improvement after return to civil life is due to the impossibility of continuing the same unfortunate procedure. But until we get some general recognition throughout the Service that a large proportion of cases with minor irregularities or murmurs are of no importance, as on the other hand that the absence of murmurs is no criterion of a healthy heart, we shall continue to invalid these men solely because a man with a murmur is put back at every routine medical examination to which he is subjected.

(17) Conclusions.

(i) The term "the soldier's heart" implies that which is false. The condition is not peculiar to the soldier: it is not due to his training or duties.

(ii) The causes of the symptom complex—pain, dyspnœa, irregular action—are various, some are certainly unconnected with the cardio-vascular mechanism, and probably in the majority of cases the symptoms are really secondary.

(iii) The importance of these symptoms is exaggerated, and the conditions are not improved by the remedial measures usually adopted.

(iv) The only specific treatment for the condition which gives any good result is a system of graduated exercises. Some cases will never improve.

(v) Many of the cases invalided as V.D.H. have no cardiac lesion and are physically fit for duty.

(vi) The true incidence of all forms of heart disease in the Army is obscured, and the apparent incidence exaggerated by the inclusion of cases diagnosed on isolated symptoms.

(vii) The systematic examination of every recruit immediately on his joining a station would eliminate a good many cases which cannot be detected under ordinary conditions of recruiting.

No attempt has been made to refer to many useful contributions by various officers which have appeared in the Journal. But some of the points mentioned above have already received attention from various observers, especially the origin of many of these conditions before enlistment, and the harmlessness of many symptoms. Modern methods have increased the accuracy of the diagnosis of cardiac disorders, but at the same time many of our old standards have been modified, and diagnosis is not as yet much easier, for indeed we have not yet assimilated all that is being worked out from day to day.

THE CAUSATION AND PREVENTION OF ENTERIC FEVER IN MILITARY SERVICE.

WITH SPECIAL REFERENCE TO THE IMPORTANCE OF CARRIERS.[1]

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(*Continued from p.* 665, Vol. XX.)

PART II.—THE TYPHOID CARRIER STATE AND PREVENTION OF ENTERIC FEVER.

HAVING dealt, in the preceding paragraphs, with the causation of enteric fever, it now remains to discuss its prevention in military service, with special reference to germ carriers.

This requires a consideration of the "typhoid carrier state," both in its acute and chronic manifestations, as well as of the means at our disposal for the detection and, if possible, the cure of these conditions; so that any subsequent recommendations may be made as a logical sequence to the conception we have formed of the nature of the problems involved.

Pathogenesis of the "Acute Typhoid Carrier" State.

The pathogenesis of the typhoid carrier state can only be adequately discussed in association with the question of the pathogenesis of typhoid fever, a question which still requires very careful examination. It was at one time assumed that typhoid fever was an intestinal disease. Sanarelli[2] was, we believe, the first to oppose this view, and Houston[3] also expressed the opinion that the disease was a septicæmia. We regard this view as now proved, but, while an adequate expression of the nature of the disease, it does not deal with the question of its pathogenesis. The latter problem is by no means settled, and until further experimental work is carried out we must retain an open mind on the subject. Certain points deserve special attention in this connexion.

(1) Of a number of persons equally exposed to infection, only a certain number manifest the clinical phenomena of typhoid fever.

(2) Apart from those who exhibit the disease in an acute form,

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[1] Parkes Memorial Prize Essay, 1912.
[2] Sanarelli, *Annales de l'Institut Pasteur*, vol. vi, p. 721; vol. viii, pp. 193, 353.
[3] Houston, *British Medical Journal*, 1899, vol. i, p. 78.

certain persons are infected with the bacilli and yet do not develop the clinical features of typhoid fever.

(3) The incidence of the acute disease is much higher amongst persons under 25 years than in persons over that age.

(4) In communities, such as regiments, exposed to infection, the incidence is greater where previous exposure to infection has been slight, less where previous exposure to infection has been considerable.

(5) The incubation period of the disease is quite clearly marked out from that of the zymotic diseases, properly so called, in that it varies within wide limits instead of being practically constant. It may be said to lie between seven and forty-five days.

(6) In practically all post-mortem examinations of persons dying of typhoid fever, the bacillus is found in the gall-bladder, either in the bile or in the wall of the organ, or in both situations.

(7) *B. typhosus* can be isolated from the blood of cases, practically constantly, at all periods previous to the formation of agglutinins in appreciable quantity, that is to say, up to the seventh day in ordinary cases, until much later in severe cases with retarded production of antibodies, and during relapses where the agglutinins undergo a temporary decrease.

(8) Coincident with the production of a high titre of agglutinins in the blood, *B. typhosus* disappears from the general circulation and is deposited in large quantities in the internal organs, especially the adenoid structures, the spleen, Peyer's patches and the mesenteric glands.

(9) *B. typhosus* can be isolated from the fæces frequently during the incubation period (G. Mayer,[1] Conradi[2]) and in the early days of the disease, with difficulty during the height of the attack (probably owing to the enormous growth of other bacteria in the inflamed and abnormal intestine), and in a large number of cases during convalescence. It is unusual to find the bacillus in the urine in the early stages of the attack, but it can be isolated without difficulty from this source in over 30 per cent of cases from the end of the second week and onwards into convalescence.

Bearing these facts in mind, we submit the following as a tenable conception of the pathogenesis of the disease.

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[1] G. Mayer (1910), "Ueber Typhus, Paratyphus und deren Bekämpfung," *Cent. für Bakt.*, Bd. xx, p. 234.

[2] Conradi, *Klin. Jahrbuch*, Bd. xvii, p. 297; and ditto in *Deutsch. med. Woch.*, 1907, p. 1684.

Incubation Stage.

The organism after ingestion reaches the alimentary canal and gains the portal circulation through the intestinal wall and reaches the liver, whence such individual germs as escape phagocytosis and destruction gain access to the bile. Here they are safe from the action of the body-fluids, owing to the complement-fixing properties of the bile salts,[1] and are able to multiply to some extent, passing with the bile into the duodenum, and thus again reaching the portal system and leading to fresh infection of the bile via the liver, until they attain sufficient numbers to compete successfully with the intestinal bacteria and reach the outside world in the fæces (Precocious Carriers). One of two things may now happen.

Invasion.

(1) The vicious circle of increasing infection of the intestine from the gall-bladder, with reinfection of the gall-bladder from the intestine, via the liver, may outstrip the gradual production of antibodies, which has probably been initiated by the entry of the germs from the intestine into the portal circulation, in which case a typhoid septicæmia will result and an acute attack of typhoid fever be produced; or

(2) The production of immune bodies may outstrip the increase of typhoid bacilli, in which case the infection will be gradually overcome. In this event, especially where there are slight structural lesions of the wall of the gall-bladder, due to calculi or some other cause, the *B. typhosus*, protected by the anti-bactericidal action of the bile, may establish itself in the gall-bladder without any successful invasion of the general circulation (thus producing the so-called Paradoxical Carrier), this condition being most likely to occur in later life, when the susceptibility to acute typhoid fever is lessened and the probability of the presence of calculi or structural lesions of the gall-bladder epithelium is increased.

In the cases of infection which pass into an acute attack of typhoid fever, the body will be called upon for a very high production of antibodies if recovery is to take place. As, however, the body has now to deal not only with an invasion of bacteria but also with the solution products of their body substance (toxins) it will be necessary to form not only antibacterial substances, such as opsonins and agglutinins, but also antitoxic substances. It is conceivable

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[1] Cummins, *Journal of Hygiene*, October, 1911.

that the production of the latter class of substance may be in excess of that of the former, leading to a clinical recovery from symptoms without a complete elimination of the infective bacteria from the organs. This is probably the mechanism of the "relapse" which is so common in typhoid fever; but the same conception may help to throw light on the typhoid carrier state. One thing is certain that *with the deposit of typhoid bacilli in the internal organs, which is coincident with the successful production of agglutinins and the clearing of the general circulation of germs, there commonly occurs an excretion of bacilli from the kidneys and intestine, which may last well on into and after convalescence (Temporary Carriers).* Apart from the direct excretion from infected foci it is possible also that some cases of "temporary carrying" may be conditioned by a passage of bacilli from the spleen, through the splenic and portal veins, to the liver and thus to the bile, the latter being in this way kept infected as long as the spleen contains germs.

We may recall the fact that the above summary of the conditions which we believe to underlie the pathogenesis of typhoid fever, and to explain the various phases of "acute carrying" of the *B. typhosus*, although it covers the known facts, and is founded on conceptions that have been thoroughly established, is still a hypothesis only, but it forms a useful basis for the further consideration of the "chronic carrier" state which we now proceed to discuss.

Pathogenesis of the "Chronic Typhoid Carrier" State.

When the conception of the "chronic intestinal carrier" was first enunciated, it appears to have been assumed by many that "the infective germs might lead a saprophytic existence in the intestinal tract" just as *B. coli* is assumed to do; and this idea underlies some of the methods of treatment at first suggested for the condition. We may pause for a moment to consider to what extent the normal intestinal existence of *B. coli* may be compared to the abnormal presence of *B. typhosus* in the intestinal tract of man. In experiments, already recorded, on the viability of *B. typhosus* in food it may be noted that the milk used in two experiments was found, on examination, to contain large numbers of *B. coli*, and that a sample of liver and bacon, although cooked and examined just as it had been served at table, was found on incubation to contain *B. coli*, which subsequently grew out in large numbers. In fact this organism is constantly being reinforced in the intestines from the ingested food. Further, it finds in the intestine the

FEEDING EXPERIMENTS.

Series I.—White Rats on "Human" Diet.

Animal No.	Time after the "75 million" feed	Stomach	Upper small intestine	Lower small intestine	Cæcum	Heart blood
Rat I.	1½ hours	Numerous *B. coli* and *B. typhosus*	3 colonies of *B. coli*	.. .. ..	*B. coli. B. typhosus* (numerous)	Sterile.
" II.	5 "	*B. coli. B. typhosus*	Sterile	.. .. ..	*B. coli* (many). *B. typhosus*	"
" III.	28 "	Only 1 colony (*B. coli*) on agar slope. Plate sterile. Broth sterile	*B. coli* (many), 4 small clear colonies. *Not B. typhosus*	.. .. ..	*B. coli* (many), 12 small non-lactose fermenting colonies. *Not B. typhosus*	"
" IV.	5 days..	No colonies ..	*B. coli* (many). A few clear non-lactose fermenting colonies	Nearly a pure culture of a non-lactose fermenter. *Not B. typhosus*	Sigmoid only *B. coli*	..
" V.	Control (no *B. typhosus* given in food)	" ..	.. .. ..	No colonies ..	*B. coli* (many)..	..
" VI.	" "	6 clear non-lactose fermenting colonies (no typhoid)	.. .. ..	Pure culture of non-lactose fermenters. *Not B. typhosus*	.. .. ..	..

Series II.—White Rats on "Human" Diet.

Animal No.	Time after "500 million" feed	Stomach	Upper small intestine	Lower small intestine	Cæcum	Heart blood
Rat VII.	4½ hours	(1) Streptococcus, (2) Non-lactose fermenting. colonies. *Not B. typhosus*	Streptococcus. *B. typhosus*	Small non-lactose fermenter. *Not B. typhosus*	*B. coli*, and small non-lactose fermenter. *Not B. typhosus*	..
" VIII.	28 "	*B. coli.* Streptococcus	*B. coli.* Streptococcus	*B. coli.* Clear non-lactose fermenters. *Not B. typhosus*	*B. coli*	..
" IX.	48 "	*B. coli* (many).	A few coli, a few non-lactose fermenters. *Not B. typhosus*	A few coli. Some non-lactose fermenters. *Not B. typhosus*	*B. coli* (many). A few non-lactose fermenters. *Not B. typhosus*	..
" X. (Very ill)	1 week	*B. coli.* Streptothrix-like rod	No coli. Streptothrix	(1) *B. coli.* Colony Streptothrix non-lactose fermenter (Fluoresc.) *Not B. typhosus*	*B. coli.* Streptothrix	Sterile.

In Series I, 75,000,000 typhoid bacilli were mixed with the "feed" given to each rat. The animals were chloroformed and their intestinal contents examined by "plating" at varying intervals after the "feed." In Series II, a larger dose, 500,000,000 bacilli, was given. In no case were the bacilli to be recovered later than five hours after the "feed."

conditions natural to its growth and multiplication. Is this so with the *B. typhosus*? It certainly is not constantly reinforced by fresh contingents of germs ingested with food, and the experiments already detailed clearly show that the intestinal flora, especially *B. coli*, are definitely antagonistic to the survival of *B. typhosus* in the lower bowel. Even in the upper reaches of the small intestine, where the presence of bile is a great aid to the survival of this organism, there would appear to be strong antibacterial agencies at work. The experiments appended demonstrate that in the intestines of rats fed with emulsions of *B. typhosus* the organism is rapidly killed off, and cannot be isolated after eighteen hours, though recovered from various situations up to five hours after feeding. In these experiments, rats were chosen as resembling human beings in their varied diet, and the animals used were fed on "human" diet for a week before the experiment commenced in order to bring about an approximation to "human" intestinal conditions. The tendency of the stomach and small intestine to be sterile, or to contain only a few bacteria is to be noted and is quite in line with the known facts about the human alimentary tract. The large bowel is invariably teeming with bacteria, and appears to constitute a very efficient "septic tank" for the overgrowth and elimination of organisms such as *B. typhosus*, which are a source of danger when passed in the fæces. We consider, then, that there is no analogy between the presence of *B. coli* in the intestines of normal persons and the existence of *B. typhosus* in the fæces of typhoid carriers, and we believe that the word "saprophytic" in the latter connexion is misleading. We may, then, enunciate the proposition *that in the typhoid carrier, whether intestinal or urinary, the* B. typhosus *leads a parasitic existence in infective foci in the tissues, and that the fæces and the urine are merely vehicles for its transmission to the outer world.*

The evidence in support of this proposition may be summarized under the following headings:—

(1) Post-mortem and operation findings.
(2) Animal experiments.
(3) "Content" of the body-fluids in immune substances.
(4) Focal reactions following the inoculation of typhoid vaccine.
(5) Studies of the varying degrees of "excretion" by "carriers."

(1) *Post-mortem and Operation Findings.*

These are not yet sufficiently numerous to be regarded as final. On no occasion, as far as we can ascertain, have typhoid bacilli been

found in tissue lesions of the intestinal wall of chronic carriers, but they are often found in the bile and frequently in the liver and in the wall of the gall-bladder. They are also found in the small intestine contents which they have obviously reached with the bile. Ledingham quotes the results of three post-mortems (recorded by Loele, Kamm and Gray) which all point to the biliary tract as the site of the infection. In a recently recorded post-mortem on a chronic intestinal carrier by K. Bernhuber[1] the organism was recovered from the liver and gall-bladder as well as from the intestine. Here the wall of the gall-bladder is stated to have been atrophied and the liver congested. The same phenomena have been found constantly at operations, chiefly performed for the relief of gall-stones. In operative procedures on urinary carriers, of which several are on record, the condition has always been found associated with tissue lesions, in the shape of small abscesses in the kidney or ulcers of the urinary bladder; and in one kidney case (Greaves),[2] a phosphatic calculus was present.

(2) *Animal Experiments.*

Blachstein,[3] Doerr,[4] Forster and Keyser,[5] Hailer and Rimpau,[6] Morgan,[7] and others have ascertained that, following the intravenous inoculation of living typhoid bacilli in rabbits, a condition analogous to the typhoid carrier state may be initiated. The arrestment and growth of the *B. typhosus* in the biliary tract seems to be an almost constant sequence to the intravenous injection of typhoid bacilli in rabbits.

Doerr was able to recover the bacillus from the gall-bladders of animals so treated in nine out of ten experiments, from the 4th up to the 120th day after injection. J. A. Johnston,[8] in a recent paper of the highest interest, recovered the organism from the gall-bladder of rabbits similarly treated in ten out of eleven

[1] "Typhusbazillenträgerin in einem Erziehungsinstitut," *Münch. med. Woch.*, February 13, 1912.

[2] "Calculus in Connection with Urinary Carrier." Greaves (1907), *British Medical Journal*, ii, 1907, p. 75.

[3] Blachstein (1891), *Bull. Johns Hopkins Hosp.*, vol. ii, p. 96.

[4] Doerr (1905), *Cent. f. Bakt.*, Abt. I, Orig. Band 39, p. 624.

[5] Forster u. Keyser, *Münch. med. Woch.*, 1905, p. 1473.

[6] Hailer u. Rimpau, *Arbeit. a. d. Kaiserl. Gesundheitsamte*, Bd. xxxvi, p. 407.

[7] Morgan, *Journal of Hygiene*, vol. xi, No. 2, p. 202.

[8] "Research on the Experimental Typhoid-Carrier State in the Rabbit," *Journal of Medical Research*, vol. xxvii, No. 2, p. 177.

animals. The latter observer was also able to show that a secondary typhoid septicæmia lasting for a considerable time (to 30th day) developed in about seven days after the intravenous inoculation. These facts point very distinctly to the gall-bladder as the site of multiplication of the *B. typhosus* in acute infections, and appear to favour the hypothesis as to the pathogenesis of the disease previously enunciated, but they might be taken to have a greater bearing on the "acute" and "temporary" carrier state than on the chronic type. Johnston, however, in the paper above quoted, makes the very important observation that while "the bile contains *B. typhosus* up to from thirty to sixty days after inoculation," the bacillus "would then appear to become attached to the gall-bladder wall." Now, J. Koch (1909—quoted by Ledingham [1]) in investigating the histology of the gall-bladder in a fatal case of typhoid fever, reported that "the mucosa of the gall-bladder was very much corrugated and papillated, and near the extremities of the papillæ typhoid nests were found with necrotic areas in their vicinity. The superficial epithelium had completely disappeared and there was a marked inflammatory proliferation of the submucosal folds. A conspicuous feature was the close relationship of these typhoid nests to the minute end-capillaries of the submucosal papillæ, suggesting that the bacilli had reached this situation solely by way of the blood-vessels."

Has this any bearing on the work of Johnston? Why is it that after the bacilli have ceased to be found free in the bile of the experimental rabbits, they appear to "attach themselves to the wall of the gall-bladder"? And why does this occur from about the thirtieth day after inoculation and onwards? We shall return to this point, but we may here say that we believe these experimental infections of tissue to be of extreme significance as bearing on the evolution of the chronic carrier.

(3) "*Content*" *of the Body-Fluids of Carriers in Immune Substances.*

Various observers (Gaehtgens,[2] Ledingham,[3] Kennedy[4] and others) have recorded high opsonic indices in carriers, and both

[1] "Report to the Local Government Board on the Enteric Fever Carrier," Dr. J. C. G. Ledingham, 1910.

[2] Gaehtgens (1910), *Arch. f. Hyg.*, Bd. 72, p. 233.

[3] Ledingham, J. C. G. (1908), *British Medical, Journal*, 1908 ii, p. 1173.

[4] Kennedy, Journal of the Royal Army Medical Corps, vol. xiv, p. 351.

agglutinins and bactericidins are also noted as being increased. Here the time-factor has to be taken into account as it is known that the immune substances resulting from an ordinary attack of the disease remain in decreasing quantities for many months. There is no doubt, however, that they tend gradually to disappear and that it is unusual to find them in high degree after from six months to a year from the attack. In our own experience, while the agglutinins usually fall to a low level, the opsonic index remains abnormal for protracted periods in the case of most of the carriers whose sera have been examined (vide pp. 59 and 61). There is, however, the undoubted fact that, in the case of one of the fæcal carriers, even the opsonic index could not be claimed as abnormal on one of the occasions when it was worked out (Carrier F. C., on February 7, 1911), while the agglutinins had quite disappeared, although the patient was still excreting large numbers of bacilli. We regard this as merely the expression of the rule that where foci of bacterial infection are almost entirely cut off from the circulation antibodies tend to diminish. The fact that in the great majority of the cases investigated, and in all the urinary cases, the opsonic index was decidedly raised at periods amounting to years after the original attack, is very strong evidence that the *B. typhosus* exists, in these cases, *as a parasite in the tissues*, and not as a saprophyte in the cavities of the body.

(4) *Focal Reactions to Inoculation of Typhoid Vaccines.*

Irwin and Houston[1] and later Clemens and Dawson[2] have called attention to the focal pain and general disturbance following inoculation of "carriers" with vaccine for purposes of treatment. In a series of observations on Urinary Carrier F. I. (*vide* vol. xx, p. 647, Part I), we have noted that large inoculations of vaccine caused local pain and an increased excretion of urine, as well as tending to lead to a temporary increase in the excretion of germs. We would submit that these very definite focal phenomena following the inoculation of the specific germ point to a focal infection by that germ and are inconsistent with the saprophytic theory.

(5) *Studies of the Varying Degrees of Excretion by Different Carriers.*

If the *B. typhosus* existed as a saprophyte in the human intestine, it would be natural to expect that men living under identical

[1] Irwin and Houston, *Lancet*, 1909, vol. i, p. 311.
[2] Clemens and Dawson, Journal of the Royal Army Medical Corps, April, 1911.

conditions as to food, housing, exercise, and so on, would excrete the bacillus in almost equal degree. A reference to Chart I (Part I) will show that such is not the case. Taking the two fæcal carriers, S. and F. C., kept in the same ward and on the same diet, living lives as closely similar as the organization of a military hospital can make them, we find that Carrier S. gave counts that amounted to *hundreds of millions* on fifteen out of twenty observations, his average excretion amounting to about 250 million per gramme of fæces. In the case of Carrier F. C. the counts were *in millions or in tens of millions* on eighteen out of twenty observations, only twice attaining to hundreds of millions; with an average of thirty-six millions per gramme. In short, the excretion by Carrier F. C. was on a definitely lower scale than that by Carrier S. The excretion by two other fæcal carriers under observation at the same time was very markedly intermittent, the *B. typhosus* being isolated on one occasion only during three months of constant observation of Carrier P., while there were intermissions up to five weeks in duration in the case of Carrier L. These differences in quantitative output of germs are easily explained on a basis of tissue infection of greater or lesser extent, but it is almost impossible to explain them on the "saprophytic" assumption.

We conclude then that in fæcal as in urinary cases, the typhoid carrier state depends on focal infection of the tissues.

Determining Causes of the "Chronic Carrier" State.

Before examining this subject in detail, we would bring forward certain points which must be explained by any theory which is intended to explain the state of chronic typhoid carrying.

(1) The work of Klinger (quoted by Ledingham)[1] has shown that "whereas amongst transitory carriers young persons form the great majority, among the chronic carriers, persons in middle age and advanced life predominate markedly."

(2) The *B. typhosus* is not only present in the bile and in the gall-bladder wall, but also has frequently been found in the interior of gall-stones.

(3) There appears to be a very close association between the carrier state and gall-stones. Gall-stone troubles were diagnosed in 13·6 per cent. of Klinger's chronic carriers.

[1] "Report to the Local Government Board on the Enteric Fever Carrier," Dr. J. C. G. Ledingham, 1910.

(4) There is a great preponderance of females to males amongst chronic typhoid carriers.

The association of gall-stones with the typhoid bacillus and with chronic carriers being so marked, it has been suggested that the gall-stones result from the action of the typhoid bacillus, an idea which appears to gain support from the fact that this organism can be isolated with great frequency from the interior of gall-stones. On the other hand there is the view, perhaps rather implied than expressed in the literature of the subject, that the presence of gall-stones initiates the chronic carrier state, but against this there is post-mortem evidence that some chronic carriers at least are free from gall-stones. It is significant that the conditions of age and sex associated with a preponderance of chronic carriers are just those associated with gall-stone formation. Schröder,[1] who examined all patients dying in the Strassburg Hospital, found gall-stones in 12 per cent of all cases. There were only 2·4 per cent in patients under 20 years, the number gradually mounting until no less than 25·2 per cent were found in persons over 60 years old; 20·6 per cent of female bodies contained gall-stones as compared with 4·4 per cent of males, or nearly five to one, the proportion being highest amongst women who had borne children.

Now old age and "chronic carrying" are undoubtedly associated, while, in Klinger's research, there were found 183 female carriers to thirty-eight male, or nearly five to one—a figure that corresponds exactly with Schröder's sex-incidence of gall-stones. Much experimental work has been done as to the connexion between *B. typhosus* and gall-stones. It has been shown that the organism appears to penetrate into gall-stones allowed to remain in broth cultures of the germ (Gilbert and Fournier),[2] and that *B. typhosus* can bring about a precipitate of cholesterin when grown in filtered bile (Bacmeister).[3] That gall-stones can be, and are, produced by the vegetation of *B. typhosus* in the gall-bladder can hardly be doubted, but it seems clear that gall-stones can result from other causes than the *B. typhosus*. The connexion between the two seems, however, to be a very close one, and must be borne in mind in considering the pathogenesis of the carrier state.

We have already expressed the view that the *B. typhosus* uses

[1] Quoted by G. A. Gibson, M.D., "Text-book of Medicine," 1901.

[2] Gilbert et Fournier (1896): *Comptes rendus de la Société de Biologie*, t. 3, ser. x, p. 155.

[3] Bacmeister: *Münch. med. Woch.*, 1908, pp. 211, 283, 339.

the bile as a medium in which to increase during the incubation stage of an acute attack. We have also mentioned the probability that when, during the attack, the organisms are collected in the spleen and abdominal lymphoid tissues, as well as in the small intestine itself, a passage of germs may take place from these sites along the splenic and portal veins to the liver and thus once more to the gall-bladder. None of these cases involve tissue lesions of the walls of the bile passages, but merely the collection and growth of the bacillus in the bile, where it is safe from the lytic action of the body fluids. But in speaking of the experiments of Johnston, which showed that in rabbits intravenously inoculated with typhoid emulsions, the bacilli "seemed to become attached to the gall-bladder wall" from the thirtieth to the sixtieth day after the inoculation, we laid stress upon the fact that at this stage a tissue-invasion had apparently taken place. To show that similar tissue invasions take place in typhoid cases, we cited the observation of J. Koch, who found, in an autopsy on a fatal case, that there were typhoid nests near the extremities of the submucosal papillæ, in close association with the minute end capillaries, and suggesting that the bacilli had reached this situation through the blood-stream. We consider that when agglutinins have been formed in the course of typhoid fever, there is every chance that clumps of agglutinated bacilli may be arrested at this situation, being unable to pass the end-points of the minute capillaries. Such clumps are to be found in the spleen, lymphoid tissues and other internal organs at the same stage of the disease. In Johnston's experimental rabbits, the septicæmia came to an end as a rule about the thirtieth day after inoculation, i.e., just at the time when the bacilli "seemed to become attached" to the gall-bladder wall. We think it probable that the gall-bladder wall, in these rabbits, was infected direct through its own vessels and not from the bile.[1] Now the *B. typhosus* is not an organism that frequently tends to form pus. Nothing is more remarkable than the way in which the spleen and other heavily infected organs clear up after an attack without any suppuration. In the case of the gall-bladder wall, however, as in the case of the intestinal lymphoid tissue or of the renal epithelium,

[1] More recent and not yet published experiments by the author lead him to think that this "attachment" of the bacilli to the gall-bladder wall is unconnected with infection through the blood-vessels, as he was able to demonstrate it in two rabbits on the thirty-fifth day after infection although there was no secondary septicæmia in either animal, as proved by frequent negative blood culture.

the deposits are not really internal, but on the inner surface of a hollow organ. We regard the suppuration of Peyer's patches as due to invasion of the congested tissue by intestinal organisms other than the typhoid bacillus. In the case of the gall-bladder wall and the renal epithelium, the sites of typhoid deposits may or may not be subject to mechanical irritation on the surface directed towards the cavity. Let it be noted that, in both situations, there is a tendency to lithiasis, liable to be increased in the course of typhoid fever by the deposit of cholesterin as a result of the presence of typhoid germs in the bile, or by the highly concentrated urine of pyrexia in the case of kidney infection. Or again, especially in the later periods of life, there may be pre-existing lesions in the walls of the gall-bladder or of the tubules and pelvis of the kidneys, which would permit of direct infection. Under these circumstances, it is not hard to understand that focal infections of the bile-area or in the kidneys must frequently occur in the course of typhoid fever. Such focal infections will be all the more common where mechanical irritation is supplied by the presence of biliary or urinary gravel or stones, or where there is pre-existing loss of surface in the walls of the cavities concerned—*in other words, the determining factors for focal deposits are much more common in middle life and advanced age.*

Again, the tendency to healing of such deposits will be greater where a good circulation of blood and a high vascularity of the tissues co-exist with an absence of local irritants such as lithic deposits. *In other words, the tendency of youth and adolescence will be to temporary infections only, of middle life and old age to the formation of chronic foci of the typhoid bacillus;* while the stasis of circulation of blood and the slowing of the passage of bile by tight-lacing, and in some cases the pressure of an enlarged uterus, will tend to make the female sex more liable than the male both to cholelithiasis and typhoid infections of the biliary area.

The extreme chronicity of these foci, however, and their obstinacy in the face of treatment, even where, as in vaccine-therapy, it can be demonstrated to have resulted in an increase of immune substances in the blood, marks them out from other chronic infections, and requires to be explained. We may find the explanation, perhaps, in the case of infections of the hepatic area and gall-bladder, in the anti-bactericidal action of the bile-salts while, in the case of the kidney, the effects of acid secretions in inhibiting the action of opsonins must be borne in mind as a possible explanation. This action of acids has been well shown by

Irwin and Houston [1] and we have found support of their work in our own experiments. Once established, these foci probably tend to become so shut off from the circulation that there is the further factor of mechanical obstruction to the access of bacteriotropic substances, while the "aggressive" action of chronic purulent collections, recently laid stress on by Dudgeon [2] may be yet another possible protection to the typhoid bacilli in the foci of infection.

As to the connexion of "chronic carrying" with gall-stones, we consider that the same conditions which lead to gall-stone formation also favour the formation of chronic foci of typhoid infection in cases where the specific germ happens to be present. The previous presence of gall-stones, leading to the mechanical production of loss of substance in the walls of the gall-bladder, will certainly favour the direct infection of these sites by bacilli present in the bile and may explain the origin of those chronic carriers who have never experienced an acute attack of the disease—the "paradoxical carriers" as they are called by Saquépée. On the other hand, it is almost certain that typhoid infection of the bile may produce gall-stones, which in their turn will tend to make chronic the acute infections of the tissue of the gall-bladder wall arising, via the blood-stream, during acute attacks of the disease. So much for the bile. It must be remembered, in speaking of chronic carriers, that focal deposits of the bacillus can, and do sometimes, arise in sites other than the bile-area or the kidneys. The irregular distribution of these deposits makes it difficult to deal with them, but it is the case that they are generally in close connexion with bone or periosteum, in situations, that is, where the impact of bruises or blows is most resisted and therefore most effective in causing injury. It seems unlikely that such tissue-infections would be so, as it were, accidental in position unless there were some accidental basis for their development, such as the congestive after-effects of traumatic or other injuries.

To sum up, then, we regard the focal lesions in "chronic carriers" as due to the invasion, by the typhoid bacilli, of sites rendered vulnerable by some ancillary cause, either pre-existent or coincident with the typhoid infection. Such causes are most likely to occur in middle life or old age, are especially liable to be present in the bile-areas and in the kidneys, owing to the tendency, in these situations,

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[1] *Lancet*, January 30, 1909.

[2] "The Croonian Lectures," *Lancet*, June 15, 22 and 29, 1912.

to lithic deposits, and together with the anti-bactericidal action of the bile and other fluids, are able not only to initiate, but to render chronic the focal lesions that constitute the typhoid carrier state.

Intermittency of Excretion.

Typhoid foci, like tubercle foci, may be described as "open" or "closed." Those carriers whose lesions take the form of periosteal deposits are quite harmless unless the abscess be opened for drainage. We have heard of a case in which such a "carrier," harmless for sixteen years after his acute attack, caused a fatal infection of his wife, who dressed the abscess after surgical interference. The majority of carriers, however, are naturally "open" because their lesions are upon the surfaces of cavities connected with the outside world. In these cases, there is a great tendency to variation in the number of germs excreted from the body, but whether the foci really "intermit" in the excretion of bacilli is open to question. In the case of urinary carriers, where the excretion of bacilli from the foci is practically equivalent to excretion from the body, since there is not the long period of destructive competition with other organisms which occurs in the intestine, the constancy with which the organisms can be isolated day after day is remarkable. The nearest approach to a negative result in our experience was that on four occasions there were no bacilli in 0·05 c.c. of urine—the amount plated—which is by no means equivalent to saying that there were no bacilli in the urine. It is, of course, possible that "pouching" of the infective foci may lead to an occasional intermission in excretion, but the point we wish to make is *that urinary carriers appear to "intermit" much less frequently than fæcal carriers.*

In the latter, the question whether the typhoid bacilli are to be excreted from the body will depend largely on the time of exposure to, and the bacterial nature of, the competition with other organisms in the large intestine. Of course, the initial number of germs reaching the bowel with the bile will be a very important factor in their survival also, as numerical superiority has a great bearing on success or failure in the "competition" that we have mentioned. Let us turn first to the numbers of bacilli contributed by the infective foci. This appears to vary with conditions of bodily resistance. The number of germs excreted by Carrier F. I. (urinary) was much less when this man was quiet in hospital than when he was at large and engaged in hard work. In the same patient a most

interesting "reaction" increase of germs was also seen after each considerable injection of typhoid vaccine (*vide* vol. xx, p. 647, Part I), a phenomenon also noted by Irwin and Houston who suggested that, in this manner, the fact of "carrying" might be brought to light during an intermission. Carrier F. I. on one occasion absented himself without leave while under treatment, and went on a long search for work (he was, at the time, a pensioner, under treatment as a "special case") ending up with a social evening and beer. On returning next morning, a sample of urine was taken which gave a count that was enormous compared to those made under hospital conditions, though very much below the counts obtained when the patient was engaged in work.

TABLE II.—Persistence in Excretion by Carriers.

Date of observation	Fæcal Carriers				Urinary Carriers	
	W. S. 20.8.08	F. C. 10.3.08	F. L. 11.4.07	W. P. 1900	F. I. 12.5.04	F. S. 20.5.08
1909— June ..	+	..	..	..	..	..
	+	..	..	..	..	..
July	+	..	..	−	..	..
	+	..	..	..	..	..
	+	..	..	..	..	..
	+	..	..	..	..	..
	+	−	+	..	+	+
August ..	+	+	+	−	+	+
	+	+	−	−	+	+
	+	+	−	+	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	..	−	+	−
	−	..	..	..	+	+
	..	..	..	..	+	+
	..	..	..	..	+	+
	..	..	..	..	+	−
	..	..	..	..	+	+
September ..	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	+	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	+	+	−	−	+	+
	..	..	..	..	+	..

TABLE II.—PERSISTENCE IN EXCRETION BY CARRIERS.—*Continued.*

Date of observation	Fæcal Carriers				Urinary Carriers	
	W. S. 20.8.08	F. C. 10.3.08	F. L. 11.4.07	W. P. 1900	F. I. 12.5.04	F. S. 20.5.08
October ..	+	+	−	−	+	+
	+	+	+	−	+	+
	+	+	+	−	+	+
	+	+	+	−	+	+
	+	+	+	−	+	−
	+	+	+	−	+	+
	+	+	−	−	+	+
	..	..	−	..	..	−
November ..	+	+	+	..	+	+
	+	−	−	..	+	+
	+	..	−	..	+	+
	..	..	−	..	+	+
December ..	..	..	..	..	+	+
1911	..	−	..	..	+	..
	..	+	..	..	+	..
	..	−	..	..	+	..
	..	+	..	..	+	..
	..	+	..	..	+	..
	..	−	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..
1912	..	+	..	..	+	..
	..	+	..	..	+	..
	..	+	..	..	+	..
	..	+	..	..	+	..
	..	−	..	..	+	..
	..	..	..	..	+	..
	..	..	..	..	+	..

In a case recorded by Cummins[1] there were two long intermissions in excretion by a fæcal carrier with distinct gall-bladder symptoms, each apparently initiated by a course of X-ray treatment, though on both occasions the excretion recommenced at a later date after the treatment had been suspended. These intermissions were in all probability due to an amelioration of the local conditions at the focus, which was not maintained.

[1] JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xiv, p. 351.

In a urinary carrier, then, a true cessation to excrete bacilli, especially if maintained for long, may be regarded as very hopeful as it almost certainly points to an amelioration of the local condition at the infective foci. In a fæcal carrier, a prolonged intermission is probably due to the same cause, but in view of the small chance of survival in the bowel where the number excreted from the foci is small, *a negative result of examination of the fæces must be regarded as of but little significance unless it is repeated on many occasions over a long period.* In this connexion the limitations of technique must be borne in mind. It does not follow that because *B. typhosus* cannot be recovered from a mixed culture it is therefore absent. It may be that a dilution only just sufficient to give a "countable" plate of *B. coli* will be so high as to quite dilute out the small number of typhoid bacilli present.

We regard it as more than likely that many persons who have ceased to excrete bacilli even during long periods may still be carriers, though with few and not extensive lesions. Such persons may again become excretors if the local condition changes for the worse under circumstances involving fatigue or privation.

In fæcal carriers then, the fact that a series of examinations have proved negative gives no ground for the inference that the local condition is cured.

"DETECTION OF CARRIERS."

The final proof of "carrying" still rests with the detection of the *B. typhosus* in the excreta. In other words, we can only say that a man is a carrier when we have proved him to be an excretor. We are thus, at once, face to face with a limitation, since there is reason to believe that many carriers do not excrete under normal conditions.

Assuming that we are dealing with a carrier who is also excreting germs and that the only problem is to find them, our success will depend upon our skill in applying the technique at our disposal. The relative merits of different media have been discussed *ad nauseam,* and this essay, all too long as it is, shall not be further burdened with a reiteration of what has been so often and so well said before. We may, however, deal briefly with a few of the principles which underlie the attempts to separate the *B. typhosus* from other organisms.

(1) In dealing with solid media, it is established that the addition of 0·5 per cent of sodium taurocholate will inhibit for a time the growth of organisms other than those of the typhoid colon group.

(2) The inclusion of one (or several) substances not acidified by the organism sought for but rapidly acidified by other organisms expected to be present with it will, in the presence of an indicator, lead to the organism sought remaining colourless, while the others produce a colour reaction with the indicator employed.

These two cardinal principles are applied in most of the media used for the isolation of *B. typhosus* from fæces. Where *B. coli* is present in much larger numbers than *B. typhosus*, attempts are made to retard the growth of the former while not interfering with the latter organism. The most successful achievement in this direction has been the introduction of "brilliant green" by Conradi. The point here is that *B. coli* is only *retarded*, not entirely inhibited, and this involves a very early examination of the plates. Unfortunately, in our experience, *B. typhosus* is also retarded to some extent. The modification of Fawcus,[1] while clearly differentiating the two organisms, owing to the lactose which it contains, should perhaps, be classed with the differential media properly so called, rather than with the inhibitory.

There remains the method of "enrichment" of *B. typhosus* in a mixed culture, either by increasing its growth as compared to other organisms present, or inhibiting the growth of other organisms while not retarding *B. typhosus* to the same extent.

This line of research involves a preliminary growth in a fluid medium with subsequent plating on a differential solid medium. In the case of the *B. typhosus*, the usual enrichment method of growing the fæces in a fluid medium containing a substance fermented by the organism which it is sought to increase, but not fermented by those that it is desired to retard, is inapplicable, as the substances acidified by *B. typhosus* are also strongly fermented by *B. coli.* It is necessary, therefore, to work on the line of retarding the growth of *B. coli* while not retarding *B. typhosus*. This object is obtained to some extent by malachite green broth, and we have tried a "brilliant green" bile-salt broth with results that were at the time regarded as promising. Our experience in this line of work is not yet sufficient to justify definite conclusions, but we think that, on theoretical grounds, it certainly offers a prospect of success. It is necessary to subculture on to plates after a *short* period of incubation and to take the upper layers of the fluid only.

All the methods mentioned will be successful if properly used. The points to be borne in mind in direct "plating" of fæces are:

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[1] Journal of the Royal Army Medical Corps, vol. xii, p. 147.

(1) That the emulsion should be thin—about 1 per cent of fæces in the diluent answers well, but the worker soon learns to judge the proper consistency with the eye; (2) That the emulsion should stand for some little time, say half an hour, before it is plated; (3) and that the plates should be thoroughly dry before use. In examining colonies, it is well to subculture each suspected colony in broth and glucose peptone water with a fermentation tube, and also on an agar slope. The glucose tube, if acidified without formation of gas, gives valuable evidence in favour of the colony being *B. typhosus*, while the addition of 0·1 c.c. of a known anti-typhoid serum to the broth tube (which contains approximately 10 c.c.) will give a serum dilution of 1 in 100, which rapidly agglutinates the culture if it is the specific germ. The agar slope is still available for a complete examination of all suspected strains.

The procedure is thus quite simple where the *B. typhosus* is present in fair numbers. Where, however, it is greatly outnumbered by *B. coli*, it may be diluted out before discrete colonies of the latter organism are obtained, and the difficulty of finding it may be very great.

The observer should then aim at increasing the relative number of *B. typhosus* in the stools. This may be done by decreasing the time of transit through the large intestine by a smart purge, the second or third stool after the dose being most likely to give successful results. We strongly recommend that where a person is suspected, on epidemiological grounds, of being a "carrier," and the preliminary examination has proved negative, a dose of 1,000 million dead bacilli be injected as a test. This will, we believe, often give rise to a diagnostic focal reaction in the form of pain referred to the gall-bladder or kidneys, while an examination of the excreta carried out within the subsequent twenty-four hours will frequently give a positive result. If the direct search for *B. typhosus* fail, it is unlikely that the patient is causing infection at the moment, but the question of intermission again comes in and it is highly desirable that other methods should be invoked to supplement the examination of the excreta in doubtful cases.

There is also the need for some rapid and rough test, less complicated than the direct examination of the dejecta, where the problem is to find the carrier amongst a number of suspected persons.

It is usual in this case to apply the "Widal" reaction, and to select those who give a positive result for further examination. This test should always be applied in such cases, but its results are

TABLE III.—TYPHOID AGGLUTININS.

September 8, 1909.

Serum of five typhoid carriers tested against a laboratory and autogenous strains	Date of attack		Serum dilutions $\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{50}$	$\frac{1}{100}$	$\frac{1}{200}$	$\frac{1}{400}$
Carrier F.I. Urinary	12.5.04	Lab. strain	−	++	++	+	±	−
		F.I. strain	+++	+++	++	−	−	−
Carrier F.S. Urinary	20.5.08	Lab. strain	++	++	++	±	±	±
		F.S. strain	+++	+++	−	−	−	−
Carrier F.C. Fæcal	10.3.08	Lab. strain	+	±	−	−	−	−
		F.C. strain	+	±	−	−	−	−
Carrier W.S. Fæcal	20.8.08	Lab. strain	+	+	±	−	−	−
		W.S. strain	+	+	−	−	−	−
Carrier F.L. Fæcal	11.4.07	Lab. strain	+	±	−	−	−	−
		E. strain	Not carried out.					

In the above table the agglutinins of both the urinary carriers are seen to be higher than those of the fæcal carriers, the agglutinins of the latter being negligible in quantity.

TABLE IV.—Typhoid Agglutinins, December 2, 1909.

Serum of three fæcal carriers, against laboratory and autogenous strains			Serum dilutions $\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{50}$	$\frac{1}{100}$	$\frac{1}{200}$	$\frac{1}{400}$
Carrier F. C.	10.3.08	Lab. strain	+	+	±	−	−	
		F. C. strain	−	−	−	−	−	
Carrier W. S.	20.8.08	Lab. strain	+ +	+	±	−	−	
		W. S. strain	−	−	−	−	−	
Carrier F. L.	11.4.07	Lab. strain	+ +	+ +	±	−	−	
		F. L. strain	+ + +	+ +	+	−	−	

This table again brings out the fact that these three fæcal carriers had little or no power of agglutination for *B. typhosus*. The laboratory strain used was notoriously easy to agglutinate, and therefore constituted a delicate test.

TABLE V.—"Immune Bodies" in Serum of Two Carriers (Paratyphosus A.)

Agglutinins.

Serum dilutions →	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{40}$	$\frac{1}{80}$
Fæcal (Para. A) Carrier C——r..	+	+	−	−	−	−
Urinary (Para. A) Carrier C——t..	+++	+++	+++	++	+	±

by no means conclusive. It will furnish valuable information, where a positive reaction is obtained, but a negative result may be, and often is, given by a chronic carrier. Tables III and IV demonstrate conclusively that chronic fæcal carriers may be excreting large numbers of typhoid bacilli and yet give a practically negative reaction. The urinary carriers examined by us gave positive "Widals" in every case, and always in higher dilutions than the fæcal carriers. Of special interest is Table V, showing the agglutinins of two *B. paratyphosus* A carriers, the one fæcal and the other urinary. Although the latter was not excreting the germ on the day of observation, his serum was positive to a dilution of 1 in 80 for the specific organism, an unusually high titre for *B. paratyphosus* A, a germ notoriously unable to evoke the formation of "high" agglutinins even in acute cases. The serum of the fæcal carrier, though he was excreting the germ, failed to agglutinate it above a dilution of 1 in 4. To sum up, we recommend that *in the search for carriers by means of the Widal reaction, even very "low" positive results should be regarded as suspicious, and the possibility of a negative Widal in a chronic carrier be borne in mind.* In such an investigation, where the "Widal" has failed to give a satisfactory indication, we think that the injection of typhoid vaccine should be carried out in all suspected persons as a diagnostic measure, just as tuberculin injections are used to detect animals suffering from latent foci of the disease. The elicitation of focal pain may give a valuable indication for further examination of some of the persons while the others will benefit by the acquisition of immunity conferred on them by the diagnostic inoculation. Although too elaborate to be applied on a large scale, *the calculation of the opsonic index is likely to give more information than any other serological method. It should always be applied where it is a question of deciding whether a man is still a carrier and where the direct search for the organism has proved negative.* Great difficulties and many fallacies surround the application of Wright's method in the case of the typhoid bacillus, but the method of Klien[1] is likely to give satisfactory results. This method, however, is laborious and requires some practice. For the mere question whether specific opsonins for *B. typhosus* are present in a serum or not, a much less lengthy procedure is sufficient. It is well to inactivate the non-specific opsonins either by heating the

[1] "The Opsonins in Typhoid Immunity," *Johns Hopkins Hospital Bulletin*, June, 1907.

serum to 58° C. for twenty-five minutes or by leaving it standing for a week, the normal control serum being treated in the same way. A comparison of the two sera, diluted to 1 in 3 with saline, a fairly thick emulsion of the bacillus being used, will almost

TABLE VI.—Typhoid Opsonins. Fæcal Carrier F.C.

Description of carrier	Serum—how treated	Date of observation	Typhoid strain used	Phagocytosis		Cells counted
				Patients' serum	Control serum	
Carrier F.C.	Unheated. Diluted 1—5	5.10.10	"F.C." ..	16	3	50
Ditto ..	Ditto	5.10.10	Laboratory strain	45	27	50
Ditto ..	Unheated. Six days old. Diluted 1—3	12.10.10	Freshly isolated strain "M.E."	59	29	50
Ditto ..	Unheated. Diluted 1—3	7.2.11	"F.C." ..	76	72	50
Ditto ..	Heated. Diluted 1—5	8.3.12	"F.C." ..	9	5	25
Ditto ..	Unheated. Diluted 1—3	13.1.11	Virulent strain E.	86	35	50
Ditto ..	Heated. Undiluted	13.1.11	Virulent strain E.	37	17	50

TABLE VII.—Typhoid Opsonins.

Description of carrier	Serum—how treated	Date of observation	Typhoid strains used	Phagocytosis		Cells counted
				Patients' serum	Control serum	
Carrier M. F.	Heated. Undiluted	1909	M.F... ..	258	12	100
Ditto ..	Heated	10.6.10	"F." ..	19	1	50
Ditto ..	Unheated. Undiluted	10.6.10	"F." ..	609	16	100
Carrier X. ..	Serum six days old. Diluted 1—3. Unheated	12.10.10	Freshly isolated, strain M.E.	78	29	50
Carrier Capt. S.	Unheated. Diluted 1—3	8.1.11	Virulent strain E.	269	196	100
Carrier H. ..	Serum four days old. Unheated. Diluted 1—3	5.1.11	Freshly isolated, strain "B.E."	48	3	100
Carrier P. ..	Unheated. Diluted 1—3	30.1.11	Virulent strain E.	160	133	100

invariably show the presence of specific opsonins in the sera of typhoid carriers. We show the results of some observations in Tables VI and VII, and would especially refer the reader to the series of observations, by Klien's technique, on the serum of Carrier

F.I., "charted" after the method of Cummins and Cumming[1] to show graphically the opsonic content of the serum on each day of observation (Chart II). *If due regard be given to the period that has elapsed since the acute attack the presence of considerable specific opsonin in the serum of a suspected person is, in our opinion, almost diagnostic of the "carrier state."* A negative result, though uncommon, is still possible, as is shown in one of the observations on the fæcal carrier, F.C.

The Possibility of Cure.

Although a limited number of cases have been claimed as "cured" by direct interference, there is as yet no evidence to show that any known therapeutic measure is a cure for the typhoid carrier state. Having made this admission, we do not propose to discuss the relative demerits of the methods so far devised for the treatment of this condition. Suffice it to say that while lactic acid bacilli, urotropin, salol, Röntgen rays, and even chloroform injections per rectum (the last, so far as we know, in experimental animals only) have all given encouraging results, they have not proved of any real value in curing the chronic carrier. Antityphoid vaccine, too, though several cures are attributed to its use (Irwin and Houston, Clemens and Dawson, &c.), has signally failed in a large number of cases. We propose, however, to discuss the last method, as there is reason to believe that it is the only line of treatment that at present offers any prospect of success. There is one encouraging fact to be remembered. It is that, while there is no distinction to be drawn between the protracted "temporary carrier" and the "chronic carrier" except the arbitrary time-limit of "three months," *the former cease spontaneously to excrete bacilli in a large majority of cases.* There is again the fact that an accession of health such as may result from a sea-voyage sometimes leads to a cessation of excretion of germs. We are aware of several cases where men, invalided from India as "chronic carriers," have been found no longer excreting on their arrival in England, though very carefully examined on a series of occasions. *These facts point to a tendency to a natural cure of the typhoid carrier state where this has not become absolutely established.*

We are, therefore, inclined to think that continued use of vaccine, combined with attempts to alkalinize the urine as recommended

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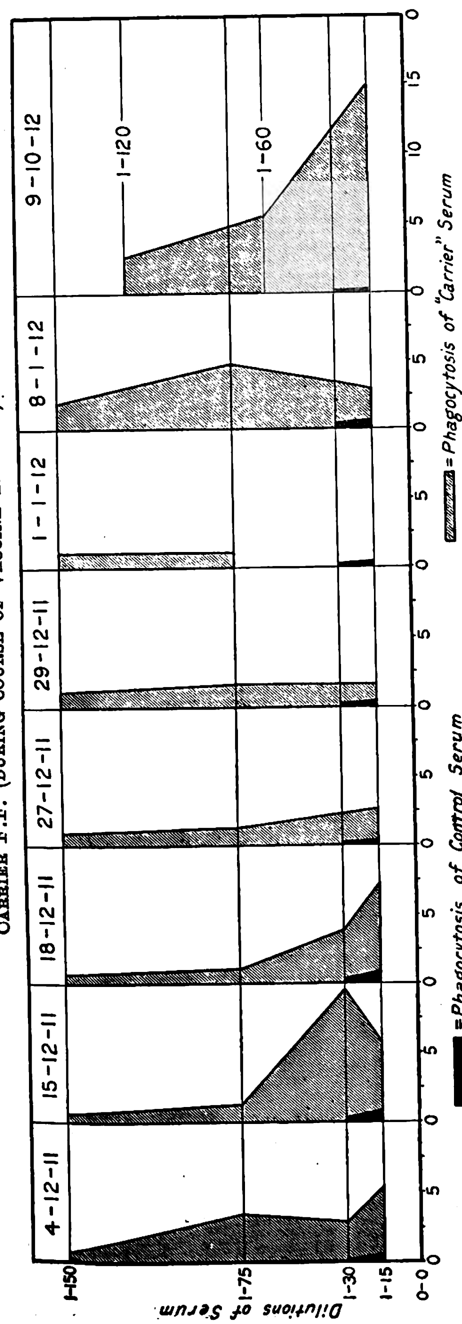
[1] Journal of the Royal Army Medical Corps, October, 1912.

CHART II.—CHART (AFTER CUMMINS AND CUMMING) SHOWING OPSONIC INDICES (KLIEN), GIVEN BY THE SERUM OF URINARY CARRIER F.F. (DURING COURSE OF VACCINE THERAPY).



Horizontal measurements represent number of bacteria per phagocyte. Vertical measurements represent the dilutions of serum used.

by Irwin and Houston, where the patient is of the urinary type, may possibly succeed if applied fairly early in the case. To give this treatment a fair chance, the carrier should be detected during convalescence and steadily treated from that time onwards. Once the lesions become shut off from the access of bacteriotropic substances by chronic inflammatory processes, the chances of successful vaccine therapy are greatly reduced, and may be regarded as non-existent where some deposit such as a calculus helps to perpetuate the mischief by mechanical irritation. The researches of J. A. Johnston, already quoted, on the typhoid carrier state in rabbits, are distinctly hopeful for the success of vaccine therapy if undertaken early in the case. Of eleven untreated rabbits killed at varying intervals after intravenous inoculation of *B. typhosus*, ten were found to harbour the germ in the bile or gall-bladder wall or both. Of seven animals inoculated at the same time with a similar dose of *B. typhosus*, but subsequently treated by the injection of vaccine, two only were found to harbour the bacillus, one of these being examined only two days after vaccination. Five out of seven were clear of the typhoid bacillus.

Our own results in the case of Carrier F.I. (*vide* Chart II) were discouraging. The injections were not followed by any rise in the titre of opsonins. The result, as to the excretion of germs, was merely to lead to a reactionary increase where large doses were given.

Operative treatment holds out a distinct promise of success where one kidney only is involved, but in the case of infection of the biliary tract, removal of the gall-bladder or of gall-stones will often be disappointing, as there is nearly always coincident infection in the liver and parts of the bile area out of the reach of operative interference.

Where vaccine therapy and operative procedures fail or are contra-indicated, it must be admitted that no known remedy exists. We can only wait for the discovery of some drug which, as salvarsan for syphilis, will be parasitotropic but not organotropic.

Prevention of Enteric Fever with Special Reference to "Carriers."

Deducting the number of men invalided and dying as the result of enteric fever, the British Regular Army may be taken to produce, each year, from 300 to 500 men who, having recovered from the disease, are again serving with their units. Multiplying the

lesser figure by the average colour-service of the soldier, subsequent to the attack, say, seven years, we infer that about 2,100 men are to be found in the ranks, at any given time, who have had enteric fever. How many of these may we expect to be chronic carriers? Observers differ markedly as to the percentage of acute cases that pass on into the chronic carrier state, some putting it as high as 5 per cent, others as low as 1 per cent. Allowing for the fact that people of advanced age and females—the classes most prone to become carriers—do not come into consideration in military service, we may place the actual number of "chronic excretors" at about 1 per cent, giving about twenty-one such persons as constantly present in the regular army in peace. We have already expressed the opinion that the mere fact of "excretion," the basis on which all figures as to the percentage of chronic carriers are founded, does not necessarily or probably give a true index of the number of persons actually carrying the germ. It is likely that, under conditions of active service, a number of men who have suffered from enteric fever would become active excretors. There is also the question of the reservists who join the colours on mobilization, and who, being older men, are likely to include a higher percentage of carriers than that just given. In addition to the chronic carriers, there are certain to be a fair number of temporary carriers as well as a proportion of men actually in the incubation stage of the disease and who will develop it later on. It is obvious, then, that while the "carriers" are not a very serious matter in times of peace, they will assume great importance in time of war. We have already devoted considerable space to this question and need not return to it in detail, but it is necessary to bear the extent of the problem in mind in considering methods of prevention. Let it be but remembered that "contact infection" has been proved to be the main source of the prevalence of enteric fever in war and that enteric fever has always been "the scourge of armies in the field," and the importance of the "carrier question" will be evident.

Leaving out of consideration the routine methods of general hygiene, the prevention of "contact" or "carrier" infection must be considered under three headings :—

(1) The discovery and disposal of "chronic carriers" who are likely to *initiate* epidemics.

(2) The detection of early, atypical and abortive cases, and the disposal of convalescents, who are certain, if undetected, to *maintain* epidemics.

(3) The rendering of healthy persons immune to the disease.

We make no attempt, in this essay, to deal with the disposal of excreta, the sterilization of water supplies, or the measures to be taken to protect food from infected dust and flies. All these questions are of vital importance in rendering harmless the undiscovered carriers that must always be present, but our concern here is with the carriers themselves.

(1) *The Discovery and Disposal of Chronic Carriers.*

This should be carried out in peace in order that the army may take the field with as few "carriers" as possible within its ranks.

The procedure that should be followed throughout the army has been already initiated in India. It seems illogical that the splendid work of the Enteric Convalescent Depot at Naini Tal should not have already led to the formation of similar institutions outside India. We should recommend that in all foreign stations where the garrison exceeds a certain strength—say 2,000 troops—there should be a depôt for enteric convalescents under the charge of a "specialist" officer, trained in the bacteriological study of enteric fever. This officer should be regarded as the pathologist of the command also, where the work of the depot is not so heavy as to justify a whole-time worker. To deal with convalescents from foreign stations with garrisons below this strength there should be a "Home Depot" at some such place as Netley, to which all enteric convalescents should be sent. This station would also dispose of "carriers" sent home from the other depots, and receive convalescents from military hospitals in England. The duties of this central Home Depot would be arduous, and would require the whole time of one officer, under whom the clinical pathologist at Netley might serve as an assistant when available. We would further recommend that all "temporary" and "chronic" carriers regarded as cured and returned to the ranks should be "followed" during at least a year after return to duty, samples not only of fæces, but of blood being sent either to the depot at Netley or the Royal Army Medical College for examination. Where "immune bodies" were found to persist for many months in the blood, the soldier should be invalided. A negative result in a sample of fæces sent by post means very little where twenty-four hours or more have elapsed since it was passed, on this account a blood sample is advisable. *No enteric convalescent*

should return to the ranks without having passed a period at a convalescent depot and being certified as no longer excreting germs.

(2) *The Detection of Early, Atypical and Abortive Cases.*

In peace this should be, and is, fairly successfully carried out. It is another matter on active service. We believe that there is too great a tendency to regard bacteriological work as "out of place" on actual active service. There is no sanitary measure more important to a commander than the early diagnosis of enteric fever cases. If this is successfully carried out, and the methods of observation and isolation of "contacts" laid down in "R.A.M.C. Training" are honestly and thoroughly observed, we see no reason why enteric fever should prevail in the future to anything like the extent that it has done in the past on active service.

The early diagnosis of typhoid fever is a matter of blood-culture. This requires skill, care, and deliberation, but not an elaborate outfit of bacteriological appliances. Our idea is that a mobile "laboratory," consisting of a closed motor vehicle, containing the apparatus for preparing media, incubating "cultures," and for the necessary microscopic and other work of isolating bacteria, should be attached to each division and accompany this formation as part of the Divisional Headquarters. A specially trained officer with two trained orderlies (one as batman) and a driver (A.S.C.) should constitute the staff. Regimental medical officers and officers commanding field ambulances should be directed to co-operate with this officer by sending to him all suspicious cases for blood-culture and such other work as may be necessary. At present this work is allocated to the Laboratory at the advanced Base or Rail Head. [*Vide* R.A.M.C. Training Para. 147 (iii)]. Our plea is for a Mobile Laboratory marching and working with the divisions.

During active operations, convalescent enteric cases should invariably be invalided to home territory, and should not rejoin the colours until certified "safe" by the Central Home Depot. The numbers so invalided would be comparatively few if the measures already mentioned had been thoroughly carried out.

(3) *The Rendering of Healthy Persons Immune to the Disease.*

This is a matter of inoculation with anti-typhoid vaccine.

We realize that it is impossible to carry out this procedure effectually on mobilization. Medical officers would then be too busy for the enormous mechanical operation of inoculating 168,000

men, and the men themselves could not be made available at such a time.

There is only one possible solution of the difficulty—*the inoculation of all troops of the expeditionary force in peace*, and a thorough organization for the inoculation of all "drafts" proceeding to the scene of operations during war. The necessity for inoculation of the Territorial Force on mobilization will be apparent when it is recalled that this force will be accommodated in billets in the home territory. The results of anti-typhoid inoculation speak for themselves. The consequences of sending out large numbers of young soldiers at the most susceptible age, to be exposed to the intensive infection that has, so far, always existed on active service, can be studied in the Medical History of the South African War and other campaigns. If the remedy—general immunization—is at all possible, it should be applied.

United Services Medical Society.

THE MEDICAL PROBLEM OF THE MOBILIZED TERRITORIAL FORCE.

By Major E. B. WAGGETT,
Royal Army Medical Corps (*T.F.*).

The progress towards efficiency made during the past few years by the Territorial Branch of the Royal Army Medical Corps inspires many of us, and myself among them, with the hope that on mobilization we shall cut a tolerably decent figure; but sober reflection raises the doubt whether, after all, we are not merely amateurs who believe that "all will go well on the night."

The position of the R.A.M.C.(T.F.) is rather a peculiar one. Unlike the combatant units of that force we are officered by men professionally qualified to deal with a considerable proportion of their duties—and it must at all events be assumed that the medical officers are as capable of dealing with individual cases of disease and injury as are those officers of the regular branch who have not seen foreign service.

Assuming this to be true we have very properly concentrated our energies upon learning the principles of the more dramatic exercises of military medicine. The force is becoming increasingly proficient in field exercises, and I believe it will be admitted that a good proportion of officers and the great majority of N.C.O.s could, even to-day, play a fairly good part in collecting wounded after an action, in rendering first aid, and in organizing a sick convoy. That we should do this exactly "according to Cocker" I do not believe; that we should fail to do it with the celerity and the accuracy of the regular force is quite certain; and that we should succeed in annoying the authorities in many small matters, such as imperfect nomenclature and so forth, is highly probable. It is inevitable that at first we should lack the rapid judgment and the quick accomplishment of duty which can only come of actual experience, but the devotion and enthusiasm which takes a doctor into the Territorial Force will, I believe, carry him through to a respectable degree of success in performing his duties after a battle.

The Territorial Force, recruited as it is on a voluntary basis, cannot devote much more than fourteen days in the year to training,

and it is axiomatic of the force that it cannot be expected to deal man for man with an expert enemy. On official reckoning 300,000 men are provided to meet 70,000, and it is not anticipated that the force will even take the field as a homogeneous fighting body without several months' preliminary training.

It is fair to assume that the rank and file of the R.A.M.C. (T.F.), that is to say that portion of it which has no professional qualification, will also require some months of special training before it is fit to carry out many of the more responsible duties. If this is true of the rank and file, it is, I contend, equally true of the medical officers.

It is, I take it, agreed that by far the most important function of the medical officer is his sanitary function, and in the vast majority of cases our knowledge of sanitation is no more than book-learning. A few of us hold the D.P.H. diploma, but sanitary measures carried out in a law-abiding civil community, with the help of a corps of expert inspectors and under the ægis of a complacent magistracy, is a very different thing to the duty of a M.O. in a mobilized force. I put it that the element of weakness of the mobilized Territorial Force lies in the lack of *experience* on the part of the medical officer.

Let us first ask, is his task likely to be an easy one? I suggest that it will be one of the greatest difficulty, more difficult than that hitherto ever confronted by any medical service.

For the sake of simplicity let us take a concrete instance and estimate the difficulties say of the senior M.O. of a brigade quartered in billets, at Slough during the first three months after mobilization. I put such a case in the hope that some officer present to-day will out of compassion for the said brigade write us a book on the lines of "The Defence of Duffers' Drift"; it would have an assured sale.

Let us take this M.O.'s difficulties in order of their importance. To begin with a comparatively small matter: the Public and the Press will expect everything to go smoothly; the T.F., they will say, has merely been mobilized for its long talked-of training; in previous years there has been no serious sickness at the usual autumn camps, there is no excuse for any now. Whatever degree of military law may exist, it is quite certain that the Press, either through its agents, or through questions in Parliament, will have sufficient knowledge of the sick returns to make things unpleasant and breed lack of confidence and loss of temper between superiors and subordinates. The M.O.'s task is going to be an unpleasant

one, and the highest authorities, realizing that extensive disease in the Force during peace will produce a sense of popular insecurity likely to hamper in the future their action in matters of high policy, cannot fail to make his position still more unpleasant and *ipso facto* less useful. You may remember Haselden's cartoon illustrating the ill-temper which passes from above downwards through the staff of a business house, and which ends with the office boy kicking the cat. Let us hope that our M.O. will refrain from kicking the water-duty men; it will be a bad day for the brigade when he loses his equanimity. But more important than the mere unpleasantness of his task is the fact that if all does not go well, even if there be no open criticism he will not be quite sure whether he really has or has not taken all the proper precautions; for he lacks that confidence in his ability which is bred of experience alone, and which cannot be bought by book-reading.

Secondly, is his task likely to be an easy one? The answer is, "No one can tell." To begin with, his standard of sanitary efficiency must be nothing less than the highest standard evolved by the advance in military hygiene which has taken place in quite recent years, since the South African War. The attainment of this standard has never been attempted in an army of European troops working in a temperate climate and in a densely populated country, and no one knows if it is or is not possible to come within measureable distance of attainment. The initial experiment must, therefore, be undertaken by the Territorial Branch of the R.A.M.C. For our purposes as R.A.M.C. England is *terra incognita*, and for that very reason full of dangers and pitfalls. In modern times no large body of troops has been quartered in English billets, and though divisional manœuvres have occasionally been held, no large aggregation of men under service conditions has remained stationary, even under canvas, for any length of time.

At our Territorial trainings we strike camp before the serious dangers of concentration make themselves felt, and always before we have any chance of testing the value of sanitary measures.

It is true that during the past eighteen years we have on several occasions noticed a marked access of sore throat and diarrhœa during the last few days of camp. Once, at least, these septic phenomena amounted almost to an epidemic, for a Brigade Detention Hospital was admitting as many as thirty to forty cases a day. But this was at the end of camp; consequently we missed the opportunity of learning something of the results of our sanitary measures. I might add that it is not always very easy to accomplish

any genuine sanitary measures on an extensive scale, or, for that matter, on a small one. I can even remember a difficulty in getting baffle plates put into a urine-cart which for several days freely watered the lines at each inequality of the ground. There seems to be an insuperable difficulty in removing the manure heaps near which we habitually camp at Aldershot; and I recall an instance where the latrine contractors having failed in their duty, and the ground being sacred against the spade, orders were given for the contents of the latrine tubs to be spread upon the ground, in dry, windy weather, 200 yards to windward of the camp. I mention such little facts as these to show that a caustic critic might claim that our training in camp sanitation was mere practice and not real experience; that we conducted a sham medical fight with blank cartridge. The critic would be wrong, for particularly in recent years genuine work has been done, but I think my senior officers will bear me out when I say that the bulk of this responsible work has been upon their shoulders and upon those of the Sanitary Companies, and that the ability of the junior officers, regimental or otherwise, to carry out efficient sanitary measures is of unknown quality. Certain it is that extremely few—so far as I know, none—of us have any experience of checking an epidemic which has obtained anything like a foothold among Territorial troops concentrated in this country.

His experience, then, in the past leaves our imaginary S.M.O. of Brigade entirely ignorant of England as a military terrain, for the reason that camp has never lasted up to the dreaded period of six weeks, when, as we are frequently assured by officers of experience, typhoid is likely to make itself felt. With regard to billeted troops, he has had no experience worth speaking of, and I doubt if many of us have ever seen troops in billets. I put it rather as a query than a statement, that billets are likely to be a source of special danger in England, and particularly in those small towns where the inhabitants have not been used to shift for themselves; and having been spoon-fed by the municipal sanitary authorities for many years, will be unable to cope with the difficulties produced by a sudden increase of population. If the inhabitants are all the more dangerous by reason of their long accustomed sense of security, so also are the troops themselves; and, I say it with all respect, so also are the combatant officers.

Neither officers nor men will believe that there is any danger lurking in an English village, and as a consequence the Territorial Force M.O. will have a much more difficult task to perform than

that of a regular R.A.M.C. officer serving in a suspected district in India.

This leads naturally to the topic of discipline. I put it that in the problem before us this is another unknown quantity—and an important one. That Territorial discipline can stand the test of rough weather and fairly hard work for a fortnight, every one knows; but what of it after three months of sham fighting, without the sobering effect of the presence of an enemy? For a fortnight the men are in good spirits, and their good temper fosters exemplary behaviour. I wonder if a young democrat, living for three months in his own country, will continue to behave like a schoolboy.

I venture to say that water discipline will be a matter of extreme difficulty among troops manœuvring in hot weather in the home counties; the onus of water-borne disease will fall on the shoulders of the divisional sanitary officer who will have no genuine means of control. The difficulty of his task will be increased by the fact that combatant officers do not really believe in sanitation, their belief in it, that is to say, is skin-deep; and until an epidemic brings the matter home their interest in it will not lead to practical results. Who has not dined at a regimental mess in camp and seen half a dozen officers empty their bladders on the grass outside the marquee? None of them believe that they can be typhoid carriers, and they are not prepared to do more than play at the game of hygiene. Even as a game it is not played with any fervour. I have asked at least fifty Territorial officers, combatant and medical, about their experience of foot-parades; not one of them had ever seen one. I need not labour this point; enough has been said to suggest that hygienic discipline is superficial in the T.F., and this is not going to make the M.O.'s task an easy one. It is his duty to recommend sanitary measures; but he has behind his recommendation, unless he be one of the few who have war service, none of that experience which alone gives weight in the eyes of the man of the world. The colonel of a regiment does not in civil life take the advice of an inexperienced young doctor about his wife's indigestion, nor will he take advice from an amateur medical officer about an insanitary camp site; hence reports to headquarters and consequent difficulties.

The physique of the men entrusted to the charge of the M.O. (T.F.) will, during the first three months of mobilization, be greatly inferior to that of the regular soldier passed for active service. A large proportion of the Territorial M.O. have never examined men for active service, and many of those who have are

not much the wiser for doing so. During the South African War I chanced to be a member of a board examining men for service, and we passed, as we thought in strict accordance with instructions, a batch of, I think, eighty-five. Almost every one of them was rejected subsequently by a board of regular medical officers—but at a later stage of the campaign these same men went out and proved themselves to be very valuable soldiers; and I for one am consequently none the wiser for the experience. We may then expect that the physical standard of the mobilized T.F. will at the outset be anything but satisfactory. Under the conditions of the annual training even the town-bred men remain in excellent health in spite of bad weather, but it is not at all certain that they will prove resistant to climatic conditions under the stress of prolonged fatigue, for at present the point has never been put to the test. In hot weather in a "fly-blown" camp they seem to be very prone to gastro-enteritis, and the vast majority of them are not immunized to typhoid. A large number of them have not been re-vaccinated for smallpox, and I venture here to ask whether re-vaccination will be obligatory on mobilization. If not the M.O. may expect an extremely difficult problem, for very few of us have civil experience even of sporadic smallpox, and the authorities cannot expect us to be proficient in the early detection of an outbreak.

Finally, we shall be working, during the critical first three months, with R.A.M.C. personnel who have no genuine, reliable knowledge of sanitation. This is, of course, not true of the Sanitary Companies; but what of the regimental water-duty men? In some divisions they do not at present exist at all, and though intelligent men, specially enlisted, can no doubt be taught the principles of water-purification, it is very questionable if such men, unused to discipline and strange to the ways of soldiers, will succeed during the early weeks in carrying out their duties to the full. I believe that none of us would feel confidence in trusting them. I venture also to doubt whether the regimental sanitary details, under the stress of real hard work, will perform their distasteful functions with complete accuracy. It is for me extremely difficult to believe that a Territorial soldier with no pretence of enthusiasm for sanitation as an art, and who lacks the fear bred of experience abroad, will succeed in keeping the latrines fly-proof.

I yield to no one in admiration and respect for the Territorial N.C.O.; but it must be confessed that his knowledge of medical matters is, as a rule, very superficial. I recall an occurrence which is, I think, typical. During a recent training an excellent serjeant

of twenty years' service was in charge of some collecting post at which dummy wounded were arriving. Unfortunately for him a staff officer rode up at the moment, and said: "Let us suppose that an order has come in from the M.O. that this man is to have two grains of morphia. It is a hot day; possibly the M.O. is the worse for the heat; what are you going to do?" The serjeant with a confident smile replied: "I should give him six grains." No doubt the serjeant had heard at some lecture that one-sixth of a grain was a safe dose for a N.C.O. to give, and the figure 6 stuck in his head; and you will agree that this is just the kind of knowledge which comes of book-learning without practical experience. It is probable the M.Os. will make blunders equally egregious, in dealing with questions of the range of artillery or the time required to build a bridge. If our personnel is below standard so also in some respects will be our equipment; for instance, in the matter of water-carts.

The task of the Territorial Force M.O. is then a good deal more difficult than that of the regular officer, and yet his preparation for it is, of course, far less complete and the standard adopted at promotion examinations far less searching. This is inevitable under existing conditions; but is it quite fair to the Territorial soldier committed to his safe keeping?

As soon as the Territorial Army is enlisted on a compulsory basis the whole problem will be simplified, but meanwhile may it not be possible to give us something more like a professional training? In the first place, would it not be feasible to afford us facilities to attend the army manœuvres, attached, of course, as supernumeraries and by no means replacing the regular medical officers? This would enable us to see something of the method of dealing with large bodies of troops under service conditions. A much more valuable measure would be the formation of a special class of semi-professional medical officers for the Territorial Force. From the nature of things it is impossible to ask existing M.Os. to undertake anything like a long course of training, seeing that they are drawn from a class of the community already overworked in civil life; but I suggest it would be possible, by the expenditure of a few thousands of pounds per annum, to induce young medical men, newly qualified, to undergo a twelve months' course of professional military training at the public expense. I suggest that they should receive lieutenant's pay and allowances, contingent upon their passing an examination with credit; contingent also upon an undertaking to serve for five years in the T.F. or to pay a fine to reimburse

the public. I take it that the services of such officers would be eagerly accepted by the authorities, who might offer accelerated promotion as an extra inducement. I believe that if a body of young officers with this training were available, a considerable number of existing half-trained officers would, if need be, resign in their favour, from a sense of public spirit.

Many of my brother officers, justly conscious of their personal ability to deal successfully with military medical problems, may think that all is well under existing conditions. I would ask them to believe that I am not faint-hearted nor one who imagines lions in the path; on the contrary, I am one of the typical amateurs who believe that "all will go well on the night." But a little reflection leads me to think that both on grounds of justice and of policy it is necessary that the T.F. on mobilization should be provided, not with a medical service which will pass muster, but with one of the very first quality. Justice demands that a body composed of men serving their country at personal loss from a sense of patriotism should be protected by all the resources of modern military sanitation; policy demands the avoidance of a popular scare and the triumph of the "peace at any price" party. That these demands will be met is an open question and I put this question as the medical problem of the mobilized Territorial Force; and in giving their solution to it I beg that speakers will remember that though the force as a whole may, with good luck, have six months' training with *blank*, we medical officers begin work with *ball* cartridge on the day of mobilization.

DISCUSSION.

Lieutenant-Colonel Monkton Copeman, R.A.M.C. (T.F.), said: I have been greatly interested in Major Waggett's paper, with practically all of which I agree. As sanitary officer of a Territorial division, I have often wondered what would happen as regards sanitary organization on mobilization. Why are things not better? Firstly I recall my experiences as a regimental medical officer, and the attitude of the combatant branch to questions of health. They seemed to regard the sanitary squad as merely a scheme for taking away men from their proper duty. Things are much improved now, and the combatant officer is beginning to interest himself in, and see the importance of, sanitation. We have in my division a sanitary company. Many of the N.C.Os. and men are inspectors of nuisances, &c., and know their work well, requiring instruction only in the application of their knowledge to military routine. In camp the company is separated up into squads to instruct the sanitary

squads of battalions. Officers commanding brigades have frequently said how valuable they find these men. Sanitary companies only exist, however, in the 1st and 2nd London Divisions, so the sanitary efficiency of other divisions must necessarily be less. As to the military portion of our work, even supposing that a medical officer has a D.P.H., he must still learn the application of his knowledge to military life. We are not given sufficient opportunity to put our book-knowledge into practice. The surface of Salisbury Plain must not be dug up, hence the absence of earth latrines, &c. In most of our camps this is the case. We have nothing to do with the collection and disposal of excreta as this is always done by the contractor. In the case quoted by Major Waggett, the contractor was a new man, found the job beyond him, took to drink, and let everything slide. The result was as might have been expected. Again we differ from the regulars in the fact that we know practically nothing—from a sanitary point of view—about our men. From this arises the fact that we may be gathering together on mobilization "carriers" of disease such as typhoid fever and diphtheria. It is therefore probable that we should have amongst us foci of disease out of all proportion to the regulars, the danger accentuated by the sense of security conferred by serving in our own country. We are all spoon-fed to a debilitating extent, and have to make far too little personal effort in our own behalf, under conditions of modern civilization. The attitude of the average man is like that of a child who, on being asked where the milk came from, replied, "The man brings it round." Nobody knows where his food or water comes from or where his excreta go to. This attitude of the civilian will be reflected in military life. Recently lectures have been given, and the officers commanding battalions invited to attend, and this has had a good effect in impressing the sanitary point of view and establishing sympathy between the combatant and sanitary branches. As regards the possible diseases, in addition to typhoid fever and diphtheria we shall probably have to deal with smallpox also, as this disease keeps cropping up here and there even now. I would like to suggest the adding to the attestation form of a query, "Have you had typhoid fever?" Allowing for ignorance, this might still have a good effect, as men replying in the affirmative might be kept from water duties and cooking. As regards anti-typhoid inoculation, Sir William Leishman has told me that vaccine would be available from the R.A.M.C. Laboratory, and as regards re-vaccination for smallpox, the Government Lymph Establishment could meet any strain likely to be put upon it.

Colonel Harper, A.D.M.S., 1st London Division T.F., found himself in accord with the opinions expressed in Major Waggett's paper, and allowed that the Territorial Force had to face many difficulties. The sympathy of General Officers Commanding was a great asset. As to the frequent difficulties with regimental commanding officers, this was to be explained by the ignorance of the latter in sanitary matters, but things

were improving rapidly in this respect. The greatest difficulty of all was that regimental medical officers had had, as a rule, little training in civil and none in military sanitation. There are important differences between civil and military hygiene, and a knowledge of the former is not sufficient for military purposes. Referring to Colonel Copeman's suggestion that the fact of a man having had enteric fever should be entered on his attestation paper, Colonel Harper had gone into that question and had formed the opinion that the information so gained would not be worth the trouble of obtaining it, as they dealt with a class of recruit that was unlikely to give reliable replies to questions of this kind. In conclusion, he laid stress on the fact that the greatest difficulty confronting them was that their medical officers were not trained in military sanitation.

Surgeon-General Babtie: I wish to say how much I have appreciated Major Waggett's paper, and how thoroughly I agree with most —not all—of what he said. During my three years as Inspector of Medical Services I saw a great deal both of medical and other T.F. units, and although things were not so advanced then as they have probably become since, I was greatly impressed with the promising state of the Force. I am sure that things have gone ahead since then and are now even better. In preserving the health of troops it is the regimental medical officer that has to bear the brunt. Of course, he has neither the same opportunities for training nor the same incentives to progress as the other officers of his regiment, being an isolated officer working on isolated lines, and unable to exchange ideas or rub shoulders with others. Colonel Harper will agree that unit sanitation is the basis of the sanitation of larger formations. As to vaccination, this is largely a political question at present. What Colonel Harper had said of the question of recording previous attacks of enteric fever is obviously right, but no man should be employed as cook or on water duties without the regimental medical officer having previously ascertained that there is no history of typhoid fever. England as a billeting area is *terra incognita* to us all. The fact that many Medical Officers of Health are also officers in the Territorial Force, should be a great help in locating dangerous areas and in preserving the health of troops in billets. The difficulties of the Territorial Force are those of the regulars, and though it is desirable to overcome as many dangers as possible in advance, we must be prepared to take our risks in war. As to the question of Territorial officers attending manœuvres this is a question of money. Our grant is very limited, is all allotted for special purposes, and can hardly cover the training of Territorial officers. The same difficulty applies to the admirable suggestion of attaching a certain number of Territorial medical officers to the regulars for a year. We are all in sympathy with their desire for more extensive training, and would like to see their efficiency brought as high as possible, but there are so many claims on the money at our disposal that it is necessary to go slowly.

Major Waggett deserves the society's best thanks for his interesting paper.

Colonel BRUCE SKINNER, M.V.O.: We have to thank Major Waggett for a most interesting contribution to a subject discussed last year by two Territorial officers and by Major Douglas at meetings of this Society. The latter officer showed clearly what is likely to happen in unprotected troops under camp conditions. The danger of both smallpox and enteric fever was illustrated in the American concentration camps, and the result of more thorough vaccination was demonstrated by the reduction of the smallpox incidence from 9 per mille in the Spanish-American War to 4 per mille in the Philippines. In framing measures to anticipate these dangers the difficulty is to avoid interfering with recruiting. The picking out of "carriers" is important and should be done, but it will be a difficult task for the medical officer of a battalion. The latter must not only know his sanitary work, but also instruct his unit, for on the sanitary discipline and knowledge possessed by each member of the unit its health and efficiency depends. Colonel Harper is moving on the right lines—through the General—from whom the knowledge will spread downwards. The examination (*j*) for junior regimental officers might with advantage be applied to the officers in the Territorial Force as well as to the regulars. Lectures also must have a good effect, as Englishmen only need to be told the dangers of defective sanitation to be ready to avoid them. The neglect of sanitation is due to ignorance, not to slackness. The pointing out of danger spots by M.O.Hs. is all very well as far as it goes, but we must remember that the country is full of danger spots that do not reveal themselves as such under the normal conditions of rural life in England. I happened to visit a farm the other day, and noticed that the not uncommon arrangement existed of a cess-pit close to the house and a shallow well, near the cess-pit, from which the family obtained its water supply. There is no sanitation in the country villages. The only hope is to train our personnel, both medical and combatant, beforehand. We have an important asset in para. 99 K.R. by which officers commanding battalions are made responsible for efficient supervision and for remedying sanitary defects, and are saddled with grave responsibility if they neglect the advice of their medical officers.

Major S. L. CUMMINS: Although there may be difficulties in carrying out anti-enteric inoculation of the striking force, as these troops would have, perhaps, to embark at once on mobilization, it should be a simple matter to inoculate the whole of the Territorial Force against typhoid fever, as they would be at home and not so pressed for time as the regulars. The chief difficulty would be the mechanical one of getting such a large body of men inoculated by medical officers without much experience of the technique. Much valuable time might be saved if Territorial medical officers would practise in peace the preparation of the

arms, the entry of names, the sterilization of syringes, and all the minor organization necessary to get through this task rapidly and thoroughly. Any Territorial officer anxious to obtain information on this subject could, I am sure, do so by writing to Colonel Sir William Leishman, at the Royal Army Medical College.

Fleet-Surgeon BASSETT-SMITH: I would like to emphasize the importance of the instruction not only of medical, but also of other officers in sanitary matters. Speaking for the Navy, this is done at the war course at Portsmouth, where senior officers are instructed in naval hygiene, this knowledge thus permeating from top to bottom. I should like to add my thanks to Major Waggett for his important and interesting paper.

Major E. B. WAGGETT, in reply, said: I am very much obliged to the officers who have taken part in this discussion, for the question raised seems to me to be a very serious one. I venture to put it forward as a subject for grave reflection whether the Territorial Force as a whole is being treated with justice in this matter of sanitation. Surgeon-General Babtie points out that England is equally *terra incognita* to the regulars and the Territorials, but the regulars will go into billets somewhere on the Continent, not here, and it is the Territorials that will have to make the experiment of billeting in England. There is, however, no reason why the Territorials should not have a complete knowledge of their own country as a billeting area. In Switzerland, where the Militia closely resembles our Territorial Force, the troops are always exercised in billets. There the home defence army is conducted on serious lines, and the medical officers have more than a semi-professional training in military sanitation. I was able to observe their methods at first hand while spending a fortnight in touch with the medical service during the annual training. Before mobilization, the medical officers made a thorough medical survey of the country. Is there any serious reason why our Territorial medical officers should not undertake genuine work of this kind? It seems a little hard to bring up the question of finance to territorial medical officers. The authorities probably do not realize the financial sacrifices which we willingly make. In a certain unit it was calculated that the officers sacrificed, during their absence on training, professional fees sufficient to buy up the whole equipment of the Field Ambulance in which they were serving. As to army manœuvres, many medical officers would be ready not only to pay their own expenses, but to pay for the privilege of going on manœuvres and even to help towards the expenses of younger officers. The truth is that the financial authorities do not regard us as a serious element in the military defence of the country, and I think with considerable justice. They do not seem to believe that we can rise to the level of military efficiency displayed by the doctor practising at a Swiss watering-place. I venture to put it that the responsibility of mobilizing the Territorial Force without a proper sanitary service is one of the gravest importance.

Clinical and other Notes.

A CASE OF ADDISON'S DISEASE.

By Major B. W. LONGHURST.

Royal Army Medical Corps.

As Addison's disease is undoubtedly rare in military practice, the following notes of a case which came under my care last year may be of interest:—

Private H., aged 18, of the Special Reserve, 3rd Battalion, The Manchester Regiment, reported sick on June 21, 1912, complaining of diarrhœa, pains in the abdomen, confined to the epigastric region, vomiting, and faintness; but the symptom which he emphasized most was that "he felt so weak in the legs he constantly sank down to the ground from sheer weakness"; his temperature was subnormal.

Previous History.—He gave a history of syncopal attacks before enlistment, and stated that he had noticed recently that his skin had become much darker, and that he was getting weaker every day.

Condition on Admission.—Besides the symptoms mentioned above, the patient presented pigmented patches on the face, dark bronze colouring over the temples and malar bones, and around the eyes and slightly under the lower lip. The skin over the whole abdomen was deeply pigmented a diffuse bronze coloration. This was particularly well marked in the groins and over the genitals, the back and legs were pigmented to a less degree. The mucous membrane covering the gums and inside the cheeks was bluish and darker than normal, but could hardly be said to be pigmented. Heart, lungs, and urine were quite normal. Pulse 100, regular and feeble. Patient was at once put to bed, and the usual remedies to allay vomiting administered.

June 24.—The patient had not improved, the gastric pain was worse, but the vomiting had ceased. The patient located the pain very definitely in the median line midway between the umbilicus and ensiform cartilage; pressure did not appear to relieve or to make the pain worse. The skin over the abdomen, groins, and Scarpa's triangles was getting a darker bronze colour, and the skin over the chest was beginning to show signs of bronzing; there was constant sweating of the feet and legs, large beads of perspiration standing out prominently over the dorsum of both feet and anterior tibial regions, both feet and hands were cold and clammy, the skin of the feet was very pale, but the skin of the hands was bluish-red; the nails and nail beds were not pigmented, the systemic and capillary circulation was very sluggish and feeble, there was no pigmented mucous membrane to be seen in the mouth, but the buccal mucous

membrane was bluish-red in colour and darker than normal. The diarrhœa was now paroxysmal, the abdominal pains were very like the gastric crises of locomotor ataxy and the patient stated that he often had a pain which "went right round his waist." He took his nourishment well, but no drugs appeared to relieve the pain for long; the temperature was still subnormal. The case was considered to be one of Addison's disease.

June 26.—The majority of the symptoms were the same as noted above, but the eyeballs seemed more prominent; there was slight swelling of the thyroid—this had not been noticed before—there were a few hard and shotty lymphatic glands in the anterior triangles. The patient's mother arrived to-day, she informed me that her son often suffered from attacks of faintness before enlistment, and that a doctor was called in on several occasions to attend him for this. She also said that the doctor mentioned that her son had a weak heart; her son was of pure English parentage and birth, and had not had a dark skin until recently—in fact she said his skin was quite white until he became weak and ill. There was no history of arsenic, nitrate of silver, or any other drug likely to cause darkening of the skin. Dr. B. was called in to examine the case in consultation to-day; he said he considered there was no disease which could produce the signs and symptoms present except Addison's disease.

There had been no rise of temperature throughout the illness; the patient weighed 110 lb. two months ago, his weight on June 26 was 104 lb.; the pulse rate in bed was 102, increased on the slightest exertion; although his face was pale (except for the bronzing), the patient was not markedly anæmic. On a cold day, without the least muscular exertion, the patient broke out into profuse perspiration. There was no sign of any intra-abdominal growth, but some of the superficial abdominal veins were somewhat enlarged.

As the patient was invalided from the service, I was unable to follow the case further.

THE COMING OF THE AEROPLANE.

By Captain R. H. CORDNER.
Royal Army Medical Corps.

Within the last few years a new form of locomotion has appeared with almost dramatic suddenness. It seems hardly credible that little more than eight years ago Wright fitted a small motor into one of his gliders and fluttered nearly a mile. The fact was flashed to the ends of the earth, and all men proudly exclaimed that at last we had conquered the air.

To-day when we open our *Daily Mail*, and notice that some pilot has flown three or four hundred miles on end, or in a fifty miles an hour gale, or, losing control of his machine, has been dashed to earth, we hardly

trouble to read it, or simply murmur "idiot" or "poor devil," as the case may be.

In other words, aviation is an accomplished fact.

Twenty years ago if any one had prophesied (and they did prophesy) that the horse would be banished from the first line of transport to be replaced by the motor-lorry, he would have been branded with the all-condemning name "an enthusiast." Will history repeat itself? He is a bold man who will say no. Like a certain politician who, not three short years ago, contemptuously spoke of aeroplanes as "expensive toys," he will certainly live to see his error.

Having agreed that aviation has come to stay, the next step is to consider in what way this new form of locomotion, swift, vibrationless and unhampered by the mud of roads and such-like earthly ties, can be adapted for the use of the Corps.

This fact was very forcibly brought to my mind one morning when, an accident having occurred at Larkhill, an officer flew over to Bulford and, landing near the hospital, asked for the Orderly Medical Officer.

It was, I think, the sign of the times; the finger writing on the wall!

In France, the birthplace of modern aviation, the Medical Department has already taken up the new science, and last year an aeroplane, piloted by a medical officer flying rapidly over the country, was able to distinguish with ease the wounded lying about and report their whereabouts to the search parties slowly crawling over the ground.

At present it is in this direction that aviation will help us. This new power will enable us rapidly to search the battle-field, perhaps fifteen to twenty miles in length, and indicate by signal or brightly-coloured flags or other means to the collecting parties, the position of the wounded.

Already I hear some of my readers murmur the old objection: "But it is not our job" to fly aeroplanes, and that "less valuable men" should be sent. But where are they to be found? The Royal Flying Corps consists almost without exception of officer pilots, who certainly will not be available. The civilian pilots will surely say "it is not their job" when honour and glory and high pay are to be found in the ranks of the R.F.C. rather than in those of the R.A.M.C. busy clearing up the aftermath of the battle.

The difficulty of obtaining aeroplanes will be an objection raised by many, and one which is equalled only by the scarcity of pilots. However, as the machine we require will not need great speed or climbing powers, there will be little difficulty in obtaining those used at present for instructional purposes and joy-rides at the various aviation schools.

These can rise 500 to 600 ft. with ease, and have a speed of 35 to 45 miles per hour, which is fast enough for our purpose, although useless for scouting on active service.

Lastly, I would say a word about ambulance wagons. The present lorries returning from the front can carry about four lying-down cases

each, while aeroplanes already exist which, with little alteration, could carry two.

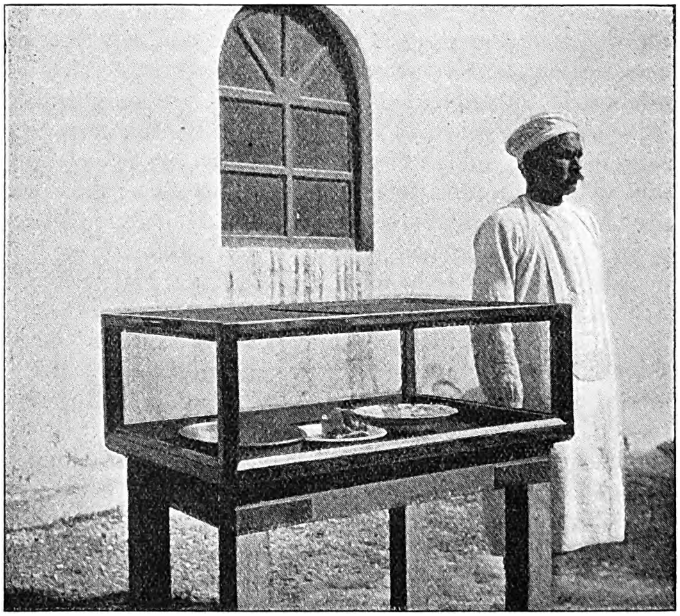
Now it needs only a slight stretch of imagination to picture Red Cross aeroplanes carrying to the base hospitals, swiftly and smoothly, those severe cases which in the rough and tumble of A.S.C. lorries on an over-crowded and uneven road would be condemned to certain long drawn-out agony and probable death.

Let us hope that when that day comes our epitaph will not be "Tekel," but that the corps, rising in every sense to the occasion, will be found capable of using this new form of transport with credit and success.

A TABLE MEAT SAFE.

By Lieutenant-Colonel W. T. MOULD.
Royal Army Medical Corps.

The importance of preventing the access of flies to food is well recognized, and all that is possible by screening cook-houses is being done in

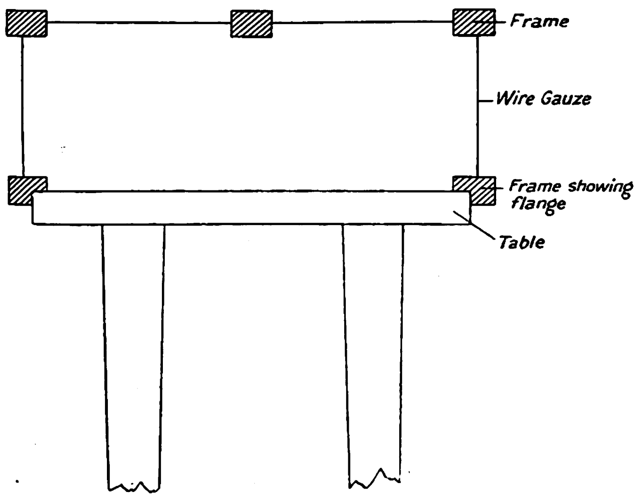


A Table Meat Safe.

India, with partial success. Food in various stages of preparation has necessarily to stand about in a kitchen, and one very frequently sees it

covered with flies. To prevent this, when I was at Barrackpore I recommended the use of some permanent form of table cover, and the safe I describe below was worked out in the workshops of the 7th Field Battery from my suggestion.

It consists of a wooden frame filled in with a fine-meshed wire gauze, the bottom of the frame having a flange all round which overlaps the edge of the table. There are handles at each end for convenience in



Section—through Table and Cover.

lifting it on and off, and by its careful use flies are quite kept away from food; the cover is far preferable to the piece of muslin or other more or less badly washed cloth usually provided.

The photograph (taken by Captain Phillips, R.A.M.C.) is that of a safe in use at the Station Hospital, Fyzabad, which cost Rs. 9/4; the drawing (not to scale) shows the section of the safe on a table.

FURTHER OBSERVATIONS ON PIGNET'S FACTOR.

By Lieutenant W. L. HUTTON.

Permanent Army Medical Corps, Canada.

There have lately appeared in the Journal of the Royal Army Medical Corps some very interesting observations on the application of Pignet's index of physical efficiency to English recruits, and to soldiers of the Indian Army.

To quote from the article by Major J. A. Balck, R.A.M.C., July, 1912:

"Pignet's factor may be briefly described as an index of physical efficiency. It is arrived at by the following formula :—

$$F = H - (C + W).$$

"In this F represents the factor; H, a man's height in centimetres; C, his chest measurement at maximum expiration, also in centimetres; and W, his weight in kilogrammes. The larger the excess of H over C + W, or, in other words, the larger the factor the poorer the man's physique. In rare cases, C + W may be larger than H, and then F becomes negative. This only occurs in exceptionally powerful men.

"Pignet, when determining his formula, added to it a scale for classifying men according to the size of their factor. This classification was as follows :—

"Factor less than 10	Very strong.
10—15	Strong.
15—20	Good.
20—25	Medium.
25—30	Weak.
30—35	Very weak.
Over 35	Useless for military purposes."

I have applied Pignet's formula to the 953 recruits who have joined the Canadian forces at the Fortress of Halifax, N.S., since 1907. The result is as follows :—

Less than 10 (very strong) Per cent	10—15 (strong) Per cent	15—20 (good) Per cent	20—25 (medium) Per cent	25—30 (weak) Per cent	30—35 (very weak) Per cent	Over 35 (useless) Per cent
16·7	14·5	20·2	23·2	13·6	7·1	4·6

It will be seen that only 25·3 per cent belong to the weak classes, and that 51·4 per cent belong to the "good," "strong," and "very strong" classes.

These results are rather remarkable and are flattering to the Canadian Permanent Force, but it must be noted that the majority of recruits who join the Canadian Permanent Force are ex-Imperial soldiers, men who are fully developed, and who have passed the hey-day of youth. Many of the Canadian-born recruits are fine, healthy young fellows, who have been used to a healthy out-door existence as lumbermen, farm hands, &c. It is a noticeable fact that very few of our Canadian-born recruits come from the cities.

For the sake of comparison, I have utilized the data contained in the article by Colonel R. H. Firth, R.A.M.C., and have appended the figures as worked out for the Canadian recruits.

	—10	10—20	20—30	30—35	+ 35
British soldiers of three months' service ..	1·4	10·3	45·0	23·9	19·4
,, ,, six ,, ,, ..	1·7	15·9	45·9	26·1	10·4
Prussian recruits	5·4	39·3	51·9	3·0	0·23
Baden ,, ...	4·7	28·0	45·6	13·6	8·10
Bavarian ,, ...	7·8	40·5	49·5	1·7	0·20
Indian soldiers	2·9	25·5	42·8	16·4	11·70
Canadian recruits	16·7	34·7	36·8	7·1	4·6

PORTABLE RATIONS.

By G. FAHEY.

Late 88th (Connaught Rangers).

The two indispensable requirements of a cavalry raid or of a detached force sent to seize and hold an important position, or of any expedition in which speed and lightness of transport are essential, are: firstly, ammunition for gun and rifle, and secondly, food for man and horse.

A sufficient supply of the first-named must be carried at all costs; other items which are not actual necessities may, perhaps, be curtailed or dispensed with entirely to allow of the carriage of ammunition.

The horse, to a certain extent, can depend on the country, according to its grazing possibilities, for part of its food. That of man, however, must either be carried for him by the transport, or by himself in his haversack. The main portion of the transport may consist of pack horse or mule. The travelling kitchen, if in existence, and the camp kettles may be left behind, the men depending on their mess tins for cooking.

Should these be the conditions under which the march is to be performed, all rations carried should have the following qualifications: They should be as portable and concentrated as is possible, with highly sustaining and nutritious properties, and should be of a nature easily prepared, cooked, or eaten in part without any ill effects on the unused portion—a defect in most canned rations.

The time, as also the necessary fuel for cooking, may be limited, so that it is desirable that the bulk of the rations carried may be eaten cold.

With the exception of the biscuit rations, a sufficient amount of portable rations to last for from four to six days might be carried in the haversack, leaving only the biscuits to be carried by the transport animals.

Canned meat might be omitted altogether from the rations, trusting to captured cattle for a supply of fresh meat. To be independent even of this source, however, enough of the portable rations should be carried.

Cheese might take the place of canned meat for the march. It has the advantage of being more portable, there is not the extra weight of the tin, and it can be eaten in part without affecting the remaining portion. The dietetic value of cheese is well known, medical authorities usually crediting it with possessing twice the nutritive value of meat. This, if anything, is under the estimate when compared with canned meat. One pound of the latter, i.e., a day's ration, would if necessary, make a meal for two men, when eaten with biscuit or bread. A pound of cheese, however, eaten with the same quantity of either biscuit or bread, would make as satisfying a meal for five men; certainly no man would require one pound, or even half that amount.

The most convenient cheese for carrying in the haversack is the Dutch variety, in small rolls of one or two pounds' weight. Being firmer than other cheeses, it is not so likely to crumble up, and would also keep fresher than when cut in portions from large drums.

In a previous article I have mentioned the desirability of chocolate as a service ration. With a view to finding a chocolate suitable for marches of the description I am now dealing with, I have been looking for a variety, which, besides being highly nourishing and concentrated, is not likely to create undue thirst when eaten with biscuit; a failing of the ordinary sweet brands.

The chocolate which best meets these demands is one manufactured by a firm which has recently entered the cocoa and chocolate market. This is called Hæmoglobin Chocolate—a name not very happily selected, being suggestive of blood. The butcher who suggested the name of "black pudding" for that well-known luxury of the poor made from the blood and hitherto waste products of slaughtered animals showed a far happier taste in names than if he had christened it "hæmoglobin sausage."

The chocolate, however, is not, as its name may suggest, disagreeable to the palate; it has, as a matter of fact, much the same taste as ordinary chocolate, but is less sweet, and, therefore, not so likely to create undue thirst when eaten with biscuit.

The one drawback that chocolate possesses is that it contains less albumin than the ordinary daily diet. To add, therefore, to its dietetic value, albumin and iron have been added in the form of hæmoglobin, without in any way detracting from its taste.

I tested its dietetic value in the most practical manner, by eating it with ordinary lunch biscuits, without liquid of any sort, and in lieu of my usual hot lunch. I found it as sustaining and satisfying as the latter. In addition, I found also that it did not create any undue thirst.

Chocolate for carrying in the haversack is best packed in narrow cakes of nine inches in length, encased in the usual silver paper and thin pliable cardboard, which should be indented in squares, so that the quantity allotted for the day's consumption may be easily broken off.

On forced marches, entailing great physical strain, something stimulating is desirable towards the later stages of the day's journey; something that will help to invigorate and encourage the system to fresh exertions. Alcohol may do this, if the unfinished distance is short and can be covered before the reaction sets in. With hot meat extract, however, there is no reaction, and one of its foremost qualities is its ability to overcome fatigue and to stimulate tired muscles to further activity.

If meat extract is carried in a jar or tin, it cannot very well be used in portions without affecting the remainder. This difficulty may be over-

come by carrying Oxo cubes, each being sufficient to make a pint of strong liquid; the usual cubes make one breakfast-cupful. Enough cubes should be carried to allow of one being used daily.

If jam is to be carried, the most convenient form of package would be that of small square tins, of four ounces each—the usual day's ration. This, besides facilitating their package in the wooden cases, would enable the tins to be carried more easily in the haversack.

A grocery ration, composed of compressed tea, concentrated cocoa, and sugar, or better still, a few grains of saccharin instead of sugar, would complete the rations to be carried on the person. By giving a ration half cocoa and half tea, it would allow the individual taste to be satisfied, by the men exchanging these items according to their fancy. Where other rations are limited, a good cocoa, owing to its food value, should be the most desirable; but tea is usually most sought after by the soldier in the field.

To insure that a full day's ration of biscuits will be available, in the event of the transport animals not being able to reach the position of the troops, the issue of biscuits for the day's consumption should be divided into three portions; one portion to be issued for breakfast, one at mid-day, and one on completion of the day's march. A reserve day's ration should be carried separately in the haversack.

The weight to be carried on the man would be 4 lb. 6 oz., made up as follows: 1 lb. of cheese; 1 lb. of chocolate; Oxo cubes, 5 oz. (including tin); three rations of jam, for consumption on alternate days 14 oz. (tins included); grocery ration, 3 .oz; reserve biscuits, 1 lb. This amount should free the column from any necessity for drawing supplies from the transport, with the exception of the biscuits, and also, if necessary, allow the column to be independent of the country for a period of from four to six days.

For an extended period, or when a partial dependence on the country for supplies is possible, the portable rations might be held in reserve or a further supply might be carried by the transport.

To prevent the premature consumption of the rations allotted for the march, the men should be instructed beforehand as to the amount to be eaten daily, according to the expected duration of the march or of the arrival of further supplies. The cheese, if in one-pound rolls, may be easily apportioned, as may also the chocolate when marked off in squares. The Oxo cubes and jam rations being already packed in daily portions, present no difficulty. The grocery ration, not being an absolute necessity, the amount to be consumed daily can be left to the men's own judgment.

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SOME COMMENTS ON THE PHYSICAL DEVELOPMENT OF SHORT SERVICE RECRUITS.

By Surgeon-Colonel J. AIKMAN.
Royal Guernsey Militia.

During the first thirty years of my service with the Royal Guernsey Militia, the force was under much the same conditions as the Volunteer Service in Great Britain, with the exception that service was compulsory. Every man who could be medically passed as fit for service in the ranks, or for light duty, was required to serve until he had reached the age of forty-five years. The drills were arranged to obviate interference with the men's daily occupation and extended over a large portion of the year. They were well trained in musketry and gun practice and proved themselves good shots. A large number of men in each year were passed by the surgeons as fit for light duty, and were employed in serving notices and such duties as men just below the standard could quite well undertake. In 1901, the War Office exacted a more complete training in camp, and the medical officers were required to make a selection of men fit to undergo the more rigorous training. A force of 1,000 men was to be maintained, all of whom should be physically fit to be put into the fighting line. I think that a similar change has taken place in the British system for the Territorial training. Under the new system the men who were formerly returned as fit for light duty are excluded in order that any detriment to their health may be avoided; but there came, in time, a shortage of recruits. It must be admitted that some of this was due to the attitude of the employers of labour, who advised their less useful men to volunteer, and put hindrances in the way of their more useful men offering their services. It also raised the question as to how far men on the border line of fitness could in a short time be made fit. The physical training laid down for the Regular Army is impossible from lack of time; the most that can be done is to correct trade deformities and to combat the alterations of balance which trade habits induce. In Guernsey, the greenhouse work causes strong men to rest on their heels with the knees bent forwards and the pelvis anteverted; the chest is contracted and the arms held so that the hands may have light play. This induces shallow breathing and a limited chest expansion. It favours chest infections and is an attitude in which a rifle cannot be securely held. Flat foot is another common result. The stone-cracker, although often a powerful man, is equally unbalanced; he crouches over his work and seldom straightens his back; but his sight is good, and he is a man not to be wasted. Shop service requires a cultivated man, but he is often feeble and walks upon a flat foot; while his chest capacity is curtailed and he gets shortwinded in running. His arms are often powerful. Rotary curvature of the spine is frequent, and this defect is a

common cause of failure to pass in musketry, because the balance of the body is disturbed by the insecurity of the spine.

The correction of these trade postures is best attained by a series of very simple exercises which aim at the restoration of the balance of the body, and the restoration of the arch of the foot. The following exercises have been sanctioned by H.E. the Lieutenant-Governor of Guernsey for trial among a few men selected by the medical officers in charge during the training of recruits in April and May, 1913. The men chosen were selected from the following categories.

(1) Chest expansions under the standard required for recruits.

(2) Obvious chest deformities and spinal curvatures.

(3) Marked cases of want of balance which might be the cause of defective physical power.

The drill was carried out by Q.M.S. Southwood, late of the R.A.M.C., at such times as did not interfere with the service parades.

Exercise I.—Seat the recruit on the floor with his legs in front of him and his arms by his sides.

"One": Throw the arms over the head and let the body fall backwards on the floor, taking a deep breath as the body falls, holding the hands above the head with the thumbs touching.

"Two": Raise the arms and body from the floor, sweeping the arms forward till the hands touch the toes, giving an impetus with a long expiration. Repeat this exercise ten times.

Exercise II.—Stand the men at "attention" 30 in. from and facing a wall.

"One": Raise the body on the toes and place the hands, thumbs inwards, against the wall, carrying the head backwards, and taking a breath. Rest a few moments, and then

"Two": Drop the hands to the sides and drop the body back upon the heels.

Exercise III.—Stand the men at "attention" 30 in. from and facing a wall.

"One": Place the fingers on the wall, thumbs downwards, fingers pointed inwards, and raise the body until the weight rests upon the toes and fingers.

"Two": Let the chest fall forward until it touches the wall, taking a deep breath, the arms bent at right angles at the elbow.

"Three": Drop the weight of the body upon the heels; cross the arms in front of the body and bend forwards until the fingers touch the toes, making a deep expiration.

"Four": Attention.

The first exercise balances the body upon the sacrum, and as the movements are made, the muscles of the spine come into balanced action with a deep inbreath and outbreath.

The second exercise balances the body and secures the action, in

consonance, of all the muscles from the ball of the foot to the back of the neck.

The third exercise continues the balance and secures the full outbreath, which is the fault of most undrilled men.

As this is the first year in which we have used these exercises in selected men, the most fair comparison of results is with the recruits of 1906, at which time the standard of recruits was at about its best. In each case the recruits had three weeks' training and they were weighed and measured on the first day and the last.

The figures of 1906 represent the whole class of recruits for the various units. The figures for 1913 represent the men on the border line of unfitness, and are arranged under the headings of their units.

Royal Guernsey Artillery and Engineers :—

Average gain in weight, 1906, 2·300 lb. per man.
,, ,, ,, 1913, 3·177 lb. ,, (one lost weight).
,, ,, chest expansion, 1906, 0·488 in. per man.
,, ,, ,, ,, 1913, 0·67 in. ,,

1st Battalion Royal Guernsey Light Infantry :—

Average gain in weight, 1906, 1·416 lb. per man.
,, ,, ,, 1913, 4·258 lb. ,,
,, ,, chest expansion, 1906, 0·155 in. per man.
,, ,, ,, ,, 1913, 0·925 in. ,, (one lost).

2nd Battalion Royal Guernsey Light Infantry :—

Average gain in weight, 1906, 2·320 lb. per man.
,, ,, ,, 1913, 3·626 lb. ,,
,, ,, chest expansion, 1906, 0·28 per man.
,, ,, ,, ,, 1913, 0·954 in. ,, (two lost).

Even if we frankly admit that the worst men gain most from a short training, it cannot fail to be recognized that this simple form of drill must have aided the more rapid development of a quite useful class of recruits. The exercises can be continued at home by such men as seek to better themselves, and without any means beyond what their bedrooms contain.

I offer these comments in the hope that these exercises may be tried for all classes of recruits.

PHLEBOTOMUS IN ADEN.

By Captain W. F. M. LOUGHNAN.
Royal Army Medical Corps.

Phlebotomus, the species of which has not yet been determined, has been discovered in Aden in small numbers. The first specimen was captured in March last. Between February and May 26, three cases of sandfly fever have come under the writer's observation.

Sport.

A GOOD GEESE AND DUCK SHOOT.

By Colonel C. E. NICHOL, D.S.O.

In February last I had the good luck to fall in for a very enjoyable three days' shoot under somewhat exceptional circumstances, and in a part of India which no officers of the Corps ever get the chance of seeing. Whilst carrying out my annual tour of inspection of the various stations in Assam, I got a friendly note from Captain G. Burke, I.M.S., the medical officer in charge of the regiment stationed at Imphal, the capital of the Manipur State, to the effect that if I chose to double up three of my marches to Manipur, I should arrive just in time for a duck shoot to be given by H.H. the Rajah of Manipur, on the celebrated Logtak Lake, and to which I was to be invited if I arrived in time. Needless to say I did not require any other hint, and arranged my onward journey accordingly.

Imphal, the capital of the Manipur State, is distant 134 miles from the nearest railway station, Dimapur, on the Bengal-Assam railway, and is reached by an excellent cart road in twelve marches. There are inspection bungalows built every 10 or 13 miles *en route*. These are free to all gazetted officers of Government travelling on duty. They are of infinitely superior build, and much more comfortable than the ordinary dak bungalow in India, and are completely fitted up with furniture and crockery, but are in charge of a chaukidar only, so one has always to take along a cook and bearer-khitmagar.

Kohima, the capital of the Naga Hills, is reached in five marches. Here, in addition to a battalion of military police, are stationed two companies of the regiment, whose headquarters are at Imphal. The road throughout is a picturesque one, the early marches being through dense bamboo jungle; after getting well into the Naga Hills, the elevation of which is from 4,000 to 5,000 ft., the growth is not so thick, and rolling hills covered with more or less open scrub jungle take the place of the former luxuriant vegetation. Many of the highest hills, however, are covered with dense forest up to their summits. During these marches one first comes across the Nagas, the inhabitants of these hills and adjacent country. On looking at the map, the tract known as the Naga Hills, lies to the south of the districts of Sibsagar and Nowgong, and north of the

Manipur State, on the south of which again lie the Chin and Lushai Hills. The north-easterly portion of this tract marked "Naga tribes" has on its southern border the Patkai Range separating it from the unknown territory which lies north of the upper portion of the Chindwin River. The actual district under our administration comprises an area of just over 3,000 square miles, with a population of a little over 100,000, included within two subdivisions, Kohima and Mokochung. This district by no means, however, embraces all the so-called Naga tribes. About two years ago I had the pleasure of voyaging down the upper part of the Chindwin River with the Deputy Commissioner of those parts. He was a very keen and ardent anthropologist, and had made an exhaustive study of the wild tribes in those districts, and he told me there were several tribes of Nagas actually located within the Burma border.

The Nagas are a peculiar and truculent lot. They are constantly giving trouble in the independent territorities which lie adjacent to our administered tracts, and, as I write this article, intimation has just come in of a severe engagement to the North of Mokochung, between the military police and Nagas living outside our border. Like the rest of the Assamese tribes, they belong to the Tibeto-Burman family, and are noted especially for their independent spirit, and their indifference to the sanctity of human life. On my return journey through Manipur territory I came on the corpse of an unfortunate Manipuri lying close to the road who had undoubtedly been the victim of foul play about three days previously. He was lying naked, and had three severe dao wounds, two across the back of his neck and one through the left buttock, passing down to the hip joint. I reported the circumstances to the political officer of the Manipur State, but it is extremely doubtful if his murderer or murderers will ever be caught. They were probably Nagas. The Nagas are short and sturdy of stature. Some wear very little clothing, but they are all very fond of bright coloured beads, and wear extensive necklaces and ear-rings. At certain of their *tamashas* the men wear an elaborate dress, a loin cloth of a dark blue or black colour ornamented with a pattern of white seeds, a chest piece something like a Highlander's sporran hung round their neck, which is composed of black human hair and goat's hair dyed scarlet and ornamented profusely with cowries, ear-rings, composed of beetles' wings and hair dyed the same brilliant red, gauntlet and cuffs ditto, and gaiters of plaited straw with a design in red; over their heads a ring of black bearskin,

and the whole costume completed by a formidable spear and shield which they carry, the spear ornamented with red hair and touches of yellow in it. When dressed like this, they resemble more the warlike tribes of African savages than any of the aboriginal tribes one comes across in other parts of India. Some of the tribes have their heads shaved at either side, which gives them a very grotesque appearance.

They eat with equal relish pigs, dogs, bison, big lizards, pythons and snakes, in fact, game of any sort, and the "gamier" it is the more they like it. Even if absolutely putrid, they eat it just the same. They appear to have a great partiality for the ordinary pariah dog, many of which I have seen being led off to be fattened and eaten. Their morals appear to be nil, and a writer in the *Imperial Gazetteer* graphically sums up the situation thus, "A Naga bride who is entitled to wear the orange blossom of virginity is said to be extremely rare."

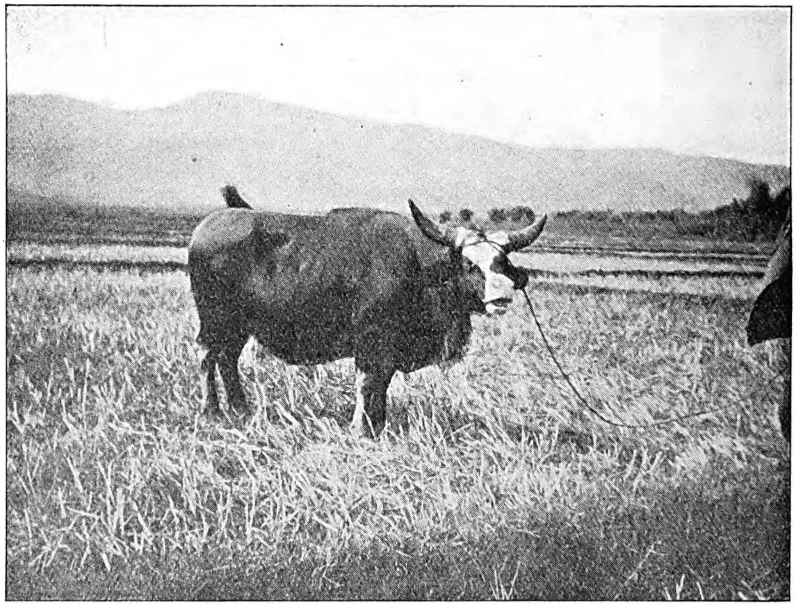
The weapons used by all the tribes are spears, shields and daos, and they have a great craving for human heads, and it is in pursuit of this pleasing pastime that the tribes in independent territory are always getting into trouble with those who have come under our subjection and civilization. Head hunting is still vigorously prosecuted amongst the many tribes situated outside our borders in the whole of the extensive "no man's land" beyond our frontiers, where, also, it is said they offer up human sacrifices yearly to ensure a good rice harvest.

I received my invitation card to the shoot shortly after my arrival at Imphal, which is a pretty little cantonment where one regiment of the Indian Army is always stationed, and where also resides His Highness, the Rajah, and the Political Agent of the State.

February 19 saw us all *en route* for the camp. The party consisted of ten guns: H.H. Prince Chura Chand Singh, Rajah of Manipur; Mr. H. C. Higgins, I.C.S., Vice-President of the Durbar, and officer in charge of the Naga hill tribes in the Manipur State; Mr. Blackie, private secretary to the Rajah; Mr. Platts, an engineer engaged in the construction of the new water supply for Imphal; Lieutenant-Colonel Tytler; Captains Fagan and Henderson; Mr. Condon, of the 17th Infantry (The Loyal Regiment), at present stationed at Imphal; Captain Burke, I.M.S., and myself. We covered the journey in various ways. The Logtak Lake is situated in the Manipur Valley, twenty-nine miles from Imphal, in a southwesterly direction. On leaving the cantonment the road becomes a "kutcha" one, very much so in parts.

The Rajah motored out in his car, taking Colonel Tytler with him. Mr. Platts went out on his motor "bike;" Captain Burke on his bicycle, as he had some vaccination to do in some of the villages *en route*. The remainder of us drove out in traps, a "dak" of ponies having been laid out for each. The last two miles to the camp we accomplished on Manipuri "tats," or on an elephant, there being only a bridle way, with swampy ground on either side.

There was nothing very interesting to be seen on the way except that I saw for the first time that curious specimen of the bovine



Mithum Bull (*Bos frontalis*).

tribe, the mithum (*Bos frontalis*), which is confined to certain parts of Assam. He was a fine bull, being led along by some wild-looking Nagas who were transporting him from one village in the hills to another, and he seemed to feel the heat of the valley very much. We all reached camp about four or five o'clock, having made an early start from Imphal.

The Logtak Lake is about six miles long and about three miles broad, of an irregular oval shape, and in the rainy season extends to quite double this size. It is situated in the Manipur Valley between two ranges of hills, one of which is close to the lake, the other runs

in a parallel direction about fifteen miles off. The lake is intersected by a chain of hilly islands which rise abruptly to a height of about 400 ft. above its surface; some of these adjoin each other, others are completely solitary, all are covered with a thick dense scrub jungle which, I understand, holds both wild boar and Kalig pheasant. I am not a geologist I am sorry to say, but certainly the geological formation of these islands appears very remarkable. They all have separate names and at the base of several of them are scattered villages, the entire population of which are fisher folk who systematically fish the lake.

Between the lake and the far range of hills are miles of swampy ground, and beyond the swamp again miles of coarse high grass, the home of the Manipur stag (*Panolia eldii*). This is the same animal as the thamin, or Burmese brow-antlered deer, but which has adapted itself to a different environment. Those of us who have shot thamin in Upper Burma know that this beautiful stag is confined to the scrub jungle of the dry zone, where water is certainly scarce, and where his favourite food is a prickly shrub which bears a small red berry. It is a species of wild plum of which he is excessively fond. In Manipur he feeds entirely in this swampy morass, retiring into the adjacent high grass in the heat of the day. Here his hoof is splay-footed to enable him easily to cover this ground, whilst in Burma he presents the ordinary hoof of the deer tribe. The horns of the Burmese animal are certainly finer and thicker, and form a more handsome trophy than any of the specimens I have been shown of the Manipur variety. Our camp was pitched in a most picturesque spot on the ridge of one of these hilly islands. Looking down, one could see the whole extent of the lake, and right across the valley between the two ranges of high hills previously mentioned. On the left at our feet lay the lake covered with innumerable artificial floating islands of green grass made by the fishermen. The latter throw in coarse green grass, and bind and stake it round carefully in a circle with stout bamboo. The fish presumably like the shade and cover of this, and congregate in it. When fishing, the men beat the water in a wide circle with bamboo, making a great noise. This drives all the fish into the shelter of this floating grass. They then put down a net all round, and inside this let down another net, and so make their haul. The size of these floating islands varied—some would be about 20 yards in circumference, others were much bigger. I understand they let for a sum of Rs. 25 each for the season, and as there are hundreds of them this must prove a profitable source

of income to the State. The fishermen's life here is a hard one—they appear to fish by night as well as by day. The species of fish I could not identify. He is of very ugly shape, blackish colour, the size of a small trout, but proved to be excellent eating. In addition to the above artificial floating islands made by the fishermen, there were a few small natural ones, on which one could land, and from some of these the best bags were subsequently made by simply sitting under cover of the high grass and shooting the birds as they flighted over. The rest of the lake was practically clear sheets of water, with no cover except the dense swamp with high grass

Landing from "Dug-outs."

which surrounded it for miles on all sides. With our binoculars we could distinguish hundreds of geese, duck, and teal sitting and flighting over the lake in all directions, which promised well for our "shikar" on the morrow.

The camp was a most comfortable and luxurious one, and consisted of several extremely well-built bamboo huts called "bashas." Colonel Tytler had one to himself, so had I, while in others, two of the party doubled up together. We had in addition one very large one, for our dining and anteroom combined, but screened off from each other. I was told this latter wonderful erection had been made by thirty men in three days.

Our afternoon tea and well-earned tub was followed by a very cheery evening. The Rajah joined us after dinner and we had a selling sweep on the first day's bag, as also one on the best individual bag. Both these sweeps, as is usual in such cases, provided no end of surprises, as there was more than one "dark horse" in the party. Afterwards the inevitable rubber of auction bridge, and then early to bed. We had the benefit of a full moon, and the view of the lake to those of us who looked down at it before turning in was indescribably beautiful, but what appealed perhaps more to our sporting instincts was the constant "music"

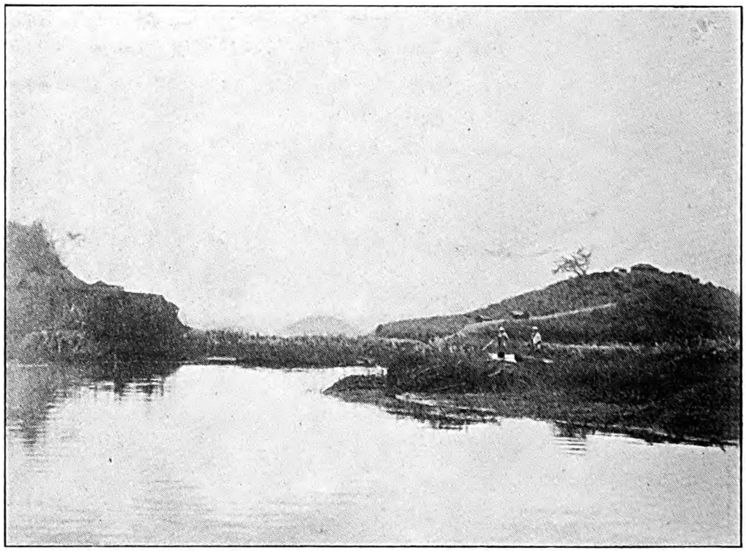
Landing from "Dug-outs."

of the geese flighting to and fro overhead. There was other music later on, but that is another story as Rudyard Kipling says!

We were all early astir next morning and on the lake just before break of dawn. Each sportsman was provided with two boats, the ordinary "dug-out" paddled by two boatmen, and we had a third man who acted as "shikari." The second boat hovered round one, picking up dead and wounded birds and had frequently to pursue a wounded goose or duck, which was often only retrieved after a long and stern chase.

The ordinary dug-out is not easy to shoot from, unless one has

had some practice at it. This was my first attempt, and my bag was a correspondingly poor one compared with those guns who had been at the game before. One has to shoot sitting the whole time, which is rather wearisome, and you cannot swing round to a bird crossing to the right. If you attempt to stand up, probably the whole "caboodle" will upset and you will find yourself, gun, and boatmen in the soup! Then again, on the Logtak, a stiff breeze often unexpectedly springs up, when the situation becomes exciting, not to say dangerous; you have then to make tracks for the lee side of one of the floating islands, and will be lucky to escape getting soaked through in the effort.



Distant View of the Camp on the Lake.

And now "let us get on to the hosses," in other words, our bag. We shot for two and a half days, the first two days the whole ten guns, the third half day only five guns.

The total bag was 774 head. First day, 327; second day, 311; third day, 136, and was made up as follows:—

Geese, grey leg, 267; barred headed, 1; duck and teal, spot bill, 35; pintail, 44; gadwell, 47; shoveller, 38; widgeon, 4; common pochard, 52; white-eyed pochard, 28; tufted pochard, 105; common teal, 61; blue-winged teal, 59; whistling teal, 24; cotton teal, 4; snipe, 5.

As regards geese, never have I seen them so plentiful; they were present literally in hundreds and hundreds, but only about twenty of the barred-headed variety were seen by the whole party. I think most sportsmen in India will agree with me in saying it is generally the barred-headed goose one sees in the majority. No "nukta" were seen, and only one solitary mallard. Both of these ducks are rare visitors to this lake I am told, as also is the red-crested pochard, none of which was seen. This is remarkable as the latter bird is spread over such a wide area in other parts of India and is almost always to be found in the bag. Our excellent sport may be put down to the following causes: No one ever

Lake, showing Artificial Islands.

shoots this lake without the knowledge or permission of the Rajah, and no visitor can enter Manipur territory without his presence being known to the authorities, so there is no chance of any wandering individuals or parties coming from other parts of India to shoot here. Then again it is only shot about twice in the season, and had not had a gun on it for the past two months.

In conclusion, a word or two in praise of our charming host, H.H. Prince Chura Chand Singh of Manipur. He is aged about 27, shoots straight and rides well, and is devoted to Manipur

polo. Players of the game all the world over know that it owes its origin to the Manipuris. The Rajah is a thorough sportsman of quite the right sort, was educated at the Ajmere College, and passed through the Imperial Cadet Corps. We have to thank him for a first-rate shoot, all the arrangements of which were perfect; his hospitality and kindness to us all was unbounded, and not least he is the proud possessor of that *rara avis*, a first-rate chef!

For my snapshots I have to thank Mr. Platt and Mr. Condon, both of whom are as successful in "pressing the button" as in pressing the trigger!

Lecture.

A LECTURE ON PHYSICAL TRAINING.[1]

By Captain A. C. AMY.
Royal Army Medical Corps.

Much of what I have to say is really an embodiment of my personal opinions on the subject of physical training. You are therefore at liberty to agree or disagree with me as you please; but in the latter event I would ask you to remember that I am forced to leave a great deal unsaid, for it is quite impossible to elaborate on this big question in the short space of time at my disposal.

It is a curious thing that the subject of physical training should give rise to so much controversy among officers of the British Army. One might naturally conclude that the principles of physical training in our nation were as fixed as the laws of the Medes and Persians. But the reverse is the case. All sorts of weird fads and fancies and hopelessly divergent views are noised abroad, just as much by experts as by the man in the street. I retain vivid recollections of examples of this state of affairs during an eighteen months' tour of duty at the head-quarters gymnasium in Aldershot, when the Swedish system was being introduced. At that struggling period we were alternately enlivened and depressed by the visitations and discussions of all sorts and conditions of practical and theoretical physical trainers. At one time an ex-inspector of Army Gymnasia looked in to see what new-fangled ideas we were playing with, and because none of the men under instruction could perform a "grand circle" on the horizontal bar, he went off in disgust with the remark, "All silly nonsense!" These were not his exact words, but they sufficiently convey his meaning in a modified form.

[1] Delivered to the officers of the garrison, Ranikhet, U. P., India, July, 1912.

On another occasion we were visited by a party of eminent professional men, who seemed to think that the Swedish system must be as injurious as the phosphorus on the Swedish match—presumably because it had the misfortune to be manufactured in Sweden. Perhaps we were wrong, but at any rate that is the only explanation we were able to arrive at in attempting to account for their (to us) extraordinary criticisms.

Now why should this be? I think the reason can be best appreciated by taking the view-point of an exponent of a particular game as a concrete example—a footballer, for instance. Before very long the fellow who plays football has had all the principles and precepts of the game knocked into him, with a degree of violence which justifies him in the belief that he has little to learn. However, when he comes to voice his views on the general subject of physical training, he forgets that they cover but a tiny, one-sided portion of that subject. Again, take the standpoint of a medical officer as an example of a different kind. He is often given to attribute various ailments to physical training, forgetful of the fact that *his* view also is apt to be circumscribed and one-sided, and—naturally, albeit unconsciously—a morbid view at that. The footballer and the doctor may hold valuable and well-founded opinions which should be listened to with all due attention and respect. But each has his limitations, and neither is more worthy of consideration as an expert in physical training than is the donkey-boy to be regarded as an exponent of horse-mastership. And so we arrive at the heart of the controversy; that is to say, we can never find a common starting-point or grounds for agreement so long as we look at the subject from the point of view of personal, practical experience only. This narrow outlook might possibly suffice if the human body were a mere machine, or even if the bodies of our soldiers all conformed to one uniform pattern of physical excellence. But alas! this is far from being the case, and so it comes about that the question of physical training must be *studied.* Although I may appear to labour the point, yet I would strongly impress upon you that it is not sufficient, though it is wise, and indeed necessary, to engage in its practice; we must also pay due consideration to its theory, while realizing that physical training is a science just as much as surgery or strategy.

What, then, does the science of physical training aim at? According to paras. 1 and 8 of our "Manual of Physical Training":—

"The object of physical training is the production of a state of health and physical fitness in order that the body may be enabled to withstand the strains of daily life, and to perform the work required of it without injury to the system." And, "The physical training of the soldier should also ensure that he is well disciplined; a good marcher; active, quick, smart, and intelligent; able to surmount obstacles in the field, and capable of withstanding the strains and hardships of active service."

The first part of the above definition is universally applicable, and the second is narrowed down for military purposes. It is a good definition, and if we admit its correctness and study it closely, I think we shall find that it is impossible to carry out its provisions unless we have a scientific framework on which to build our practical methods. However, this is by no means universally admitted, and the opponents of this view may be placed in one of three classes.

First of all may be mentioned those who still uphold the old Army gymnastic training. These people have my sympathy, but not my patience. No one deplores the decadence of the old Army gymnastics more than I do—partly because of personal participation in them, and partly because one naturally regrets the disappearance of the old feats of grace and strength which used to be such delightful and stimulating features of our gymnasia. But when one has said that, one has said everything; the fact remains that the physical development of a man who can do a "tiger balance," or a "forward planche," is not that of a good marcher or climber. And who but a lunatic or a circus performer wishes to lift a grand piano in one hand? Nevertheless, men will spend years, and probably damage fine constitutions, in attempting to carry out similar inane achievements. The feats of strength of the old system demanded *over*-development, and represented such supreme concentration of effort and energy that they could only be sustained for a very few minutes, and—without harmful results—only by those who were physically gifted by Nature. Now we do not want a system which will turn out a proficient acrobat, or a muscular monstrosity; but we do require a training which will fit the average recruit and soldier to put forth sustained effort in the field. Hence, a revival of the old system could only be justified if we were able to compel the pick of the nation's manhood to serve.

The second class of critics comprises those who wish to carry out physical training by means of an organized system of British games and sports. I think these people fall into the initial error of forgetting that the average recruit has not the same upbringing and training as his officer; he starts on a different physical plane altogether. Still (and despite the fact that we do not live in Utopia) there is much to be said for this view, provided certain difficulties could be overcome. For instance, it would be very difficult to acquire sufficient ground for playing fields large enough to exercise all the men; the financial difficulties need hardly be enlarged upon; and, finally, there is the difficulty of avoiding specialism, whereby adepts at one particular form of athletics are encouraged to pursue their special bent to the detriment of their own all-round training, and of the training of their less proficient comrades. As you know, this goes on in a modified way at the present moment; far better have a unit of good general practitioners than one composed of a few eminent specialists attended by a crowd of passive spectators.

Nor can I agree with the members of the third class, who would entirely abolish physical training as such, replacing it by ordinary military work, e.g., route-marching, running drill, &c. These evolutions are not carried out under the eyes of men who understand anything at all about the theory of physical training, and while such a system (or rather lack of system) might suffice in the case of foreign service units without any harm being done, it cannot at the same time produce a high, uniform physical standard in the recruits and young soldiers of the home units. Probably you will agree with me in this, particularly when you remember the great diversity of physical types which enter our service.

Then if I am right in deducing that under the circumstance a scientific system of physical training is necessary, the question arises, What system should we adopt? I have neither the time nor the inclination to discuss the merits and demerits of any of the so-called "systems" of the present day. After having studied a large number of them, I have so far found that they are all just as much open to destructive criticism as are the academic qualifications of the "professors" who invent them. In fact, up to date I only know of one system which has stood the test of time, which has outlived its originator and flourished as the years pass, and which is really deserving of the name—the one popularly called "The Swedish System of Physical Training." Broadly speaking, the practical application of this system is confined to Sweden, Denmark, and, to a limited extent, to Great Britain. I should like to make comparative references to military physical training in other countries, and notably in Germany, France, and Japan, but time will not permit. However, I cannot in fairness allow the American's work to pass without a short comment. Until our adoption of the Swedish system, the Americans were far ahead of us in the scientific application of physical training. They tackled the subject with all their customary energy and enthusiasm, and their results were, and still are, astonishingly good. Not that there really is any "American system"; the different centres in which physical training is in vogue are much too original and independent to tolerate any common system; each centre has its own particular method. On one occasion the director of athletics of a certain university in the United States—a doctor with Edinburgh qualifications—came to Aldershot for a couple of days to study our methods. In about one hour he had imbibed all we were able to impart; so he spent the remainder of his stay teaching *us* how to weigh and measure in decimals, what sort of diet to give a weight lifter, the kind of tonics to prescribe for a jumper, and how much electricity and massage should be applied to a sprinter, &c. The detail was extraordinary; but his university apparently existed for the primary purpose of establishing world's athletic records; academic distinctions seemed to be conferred as a matter of course, and to be regarded as of secondary importance.

Surely athleticism run mad! But shortly after my initiation into American methods I had the honour of officiating at the Olympic games in London in 1907, and there it was very evident that American athletes were trained to the highest pitch of perfection by means which, although pseudo-scientific, provided a handsome crop of winners. This story was repeated, and even accentuated, at the last Olympic meeting, and has given rise to more or less perturbation in the councils of Britain's athletic community. Nevertheless, it cannot be too strongly urged upon our would-be reformers that, if ways and means are eventually found to bring certain financial and training proposals into being, the ultimate results can only gratify the "pot hunters" at the expense of national athleticism. The fatal objection to every American method is its subordination to specialism, and this is bound to spoil a good system, especially from a military point of view. Perhaps pugilism is an exception to this dictum. It may be taken for granted that a first-class high jumper or hammer thrower may be of little use at anything else, e.g., route marching or "khud climbing." But a good boxer, physically speaking, is, and must be, a good soldier. In my opinion boxing is far and away the best military sport, and it is a curious fact that the pugilistic fraternity usually know much more about the scientific side of physical training than does any other class of athletes. This is partly due to advanced American methods, and partly to instruction in the school of bitter experience. A boxing man can seldom give you the correct reasons why he does this and that in training, but his practice is generally sound all the same; indeed, it cannot afford to be otherwise.[1]

I now propose to put before you the main features of the modified Swedish system which has been adopted by our Army. This system represents the life work of Pehr Henrik Ling, and has been the national system of physical training in the Scandinavian countries for nearly a century. Ling was a highly-educated man—litterateur, classical scholar and soldier. He became deeply interested in physical training problems, and before he had completed his great system, and solely for its sake, he had spent nearly thirty years in the study of anatomy, physiology, hygiene, and similar allied sciences. Hence he had acquired such a masterly knowledge of the possibilities and limitations of the human body that he became in every respect well equipped for his task. Ling died in 1839, and since then his system has been carried on and (if one may be permitted to say so) perfected.

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[1] At the same time I feel bound to remind you that pugilism has at least one nasty stain on its character—a disgusting, loathsome habit frequently practised in the ring—namely, the custom of blowing a big mouthful of germ-contaminated water into the gasping fighter's face. Cannot our Services set a good example by strictly prohibiting this unnecessary and revolting proceeding?

The influence of Swedish gymnastics has been gradually making itself felt in England for the past twenty-five years. If you wish to see really good work of this kind, a visit to Madame Osterberg's school at Dartford is well worth undertaking. The first big steps were taken in 1902, when the system was introduced into the Royal Navy on the recommendation of the late Colonel Fox, then Inspector of Army Gymnasia. In 1906 the system was adopted by the Army, partly owing to indirect pressure from the Medical Department, and partly because of the enlightened views of the then Assistant-Inspector of Army Gymnasia, the late Major Charles Moore of the Royal Berkshire Regiment. The services of Lieutenant Langkilde, M.V.O., 5th Danish Infantry, were loaned to us by his Government; and at the same time I also had the good fortune to be attached to head-quarters. At this period the Manual of Physical Training which you now use was in course of preparation. Herr Langkilde was a splendid exponent of his system, and Major Moore had a wonderful grip of the technique of physical training. Nevertheless, and in spite of its sponsors, I do not think that the modified system eventually evolved for our Army is, in its practical application, as good as the naval. I am sure that this is due to antagonistic or—if you will kindly allow me some latitude of criticism—even faulty methods in the training of the recruit and young soldier outside the gymnasium. Hence, unless and until our centres of elementary training become thoroughly steeped in the principles laid down in the Manual of Physical Training, our Army system must fall short of the ideal standard—the standard set by Henrik Ling, and very closely approached by the naval interpretation of Ling's teachings. Much has been written and said against our traditional "setting up," smartness, and "snap"—with what effect? Little that I can yet see in the gymnasium, and still less outside; and the latter is the dominating factor in commencing, accentuating, and perpetuating these vicious disabilities. And yet it is an undoubted fact that "the Army style," as it has been called, fares badly from a physical standpoint when weighed in the balance with such naval characteristics as grace, freedom, and ease. It is very difficult to give even a rough sketch of the Swedish system in a few minutes, and still harder to avoid technicalities; I shall try to be as concise as possible:—

The keynotes of the system are *progression* and *adaptability*.

The Swedes recognize three primary divisions, namely, (1) educational, (2) medical, (3) æsthetic.

As we are not concerned with medical and æsthetic movements, I shall confine my remarks to the educational portion adopted by us for military use. At the same time you must remember that the Swedish system, in its broader aspect, is absolutely elastic, and purposely designed for the training of people of both sexes and all ages and occupations; the soldier's training is only a special branch. It is

merely a question of constructing suitable tables of exercises for the particular class of pupils under instruction.

It is also important to note that the value of Swedish gymnastics cannot be estimated by observing a few isolated exercises, for it is necessary to consider the scheme as a whole and see how each part of it is dependent upon all other parts, and how without some of the parts the training is inadequate; whereas with all of them it is scientifically sound and complete.

When I hear a person say that the system is too "mild," I know that he has not grasped its principles of progression and adaptibility, and that he has probably seen it imperfectly applied. It is true that there are many simple and easy exercises which benefit the beginner; but they also benefit the more advanced athlete, inasmuch as they come as a change from his more strenuous work, so that, by a judicious mixture, the desired result is attained without undue strain.

Similarly, when I hear it said that there are too many "set" exercises and not enough freedom, I know again that the system is not being properly applied. Set movements are of great value in the scheme of training for realizing such objects as correct deportment, harmonious development, and so forth. However, they are amply compensated by many movements of an essentially free and even recreational nature. As a matter of fact, the Swedish system is a firm friend of recreational exercises of all kinds. It is illogical to suppose that a system which can be adopted for universal and special training could possibly discourage indulgence in football, boxing, apparatus gymnastics, or any other health-giving pastime. Indeed, the Swedish gymnast, by virtue of his training, ought to be all the more proficient in whatever games or sports he may adopt.

The system is worked out in detail in this way: Firstly, all the available exercises are grouped together under the following headings. (1) Leg. (2) Neck. (3) Arm. (4) Span-bending. (5) Heaving. (6) Balancing. (7) Lateral. (8) Abdominal. (9) Dorsal. (10) Marching and running. (11) Jumping and vaulting.

Under these headings the corresponding exercises are arranged in progressive order, and, in the composition of the tables, these exercises are selected in such a way that each table contains at least one representative from each group. A series of tables of exercises progresses in difficulty from first to last during the period of training.

Each table commences with Introductory exercises for the purpose of arousing the attention of the class and ensuring a good carriage, balance, and muscular control. Popularly speaking a "warming-up" process, lasting from five to seven minutes, takes place.

Next come the General exercises which form the real working part of the table. They are performed in a definite, progressive order, thus: (1) Span-bending — a corrective, educational movement; taken first

because it requires to be carried out calmly and without flurry, as it may easily give rise to very bad and faulty positions if great care is not taken. It is designed to produce a slight straightening of the curve of the dorsal part of the spine, but it is impossible to describe the complicated technique of this exercise in the short time at my disposal. (2) Heaving, i.e., pulling with position—also an exercise in which "style" is everything; but it differs from span-bending in requiring hard muscular work, rather than concentration of mind and energy. (3) Balancing: this rests the body, and counteracts any tendency to stiffening-up consequent on the two foregoing exercises. (4) Trunk exercises, viz., lateral, abdominal, and dorsal. These help to secure good carriage, aid harmonious development, and are beneficial in a number of other ways which I cannot now specify. The above exercises should occupy about 15 to 20 minutes, and the marching and running, jumping and vaulting, from 20 to 25 minutes, in a table occupying about 50 minutes. The last-named "exercises on the move" are designed to be essentially practical, and the greatest care has been taken to ensure this end. Jumping and vaulting exercises as performed by the Danes are a revelation to British eyes.

Lastly, a table ends with 3 to 5 minutes' Final exercises, during which a sort of "cooling down" process takes place.

Interspersed with these routine exercises are a number of subsidiary movements which are carried out at the discretion of the instructor as the need arises. Thus, if he sees the class "slacking" or assuming faulty positions, he may introduce a Corrective exercise such as "head-bending backwards." Or after such a hard exercise as span-bending he may introduce a Complementary or "opposing" exercise such as "trunk bending downwards." Similarly, a Supplementary exercise may be given in order to ensure uniform blood distribution throughout the body, after an exercise tending to cause local congestion; thus, strong heaving exercises might be followed by a short sprint.

I have purposely omitted any references to the all-important questions of circulation, respiration, digestion, &c., as they are so very technical. Nevertheless, the Swedish system does not neglect a single important organ of the human body; and although the training appears on the surface to be solely directed towards exercising muscles and joints, still it is primarily and scientifically devised for building up the musculature, and improving the functions of the internal organs. It is a maxim that muscle-building *per se* is of no importance whatever, in fact, it is harmful, and to be avoided. If the soldier is turned out with a good "wind" when taxed, it is certain that his muscular strength will suffice for his requirements and for his well-being.

The better one understands the modified system adopted by our Army, the more enthusiastic does one become up to a certain point. This point is reached when one examines our methods of application, especially as regards the training of our instructors. In the

Scandinavian countries instructors in physical training are professional gentlemen; in the case of the Army, commissioned officers. Before winning a gymnastic diploma they require to undergo a four years' university training, of which two years are spent at medical subjects and the remainder at physical training pure and simple. Compare that with our system, in which the instructors are *non*-commissioned officers who receive from four to six *months'* instruction at head-quarters. Our non-commissioned officer was an excellent instructor under the discarded "apparatus" régime, but he lacks the fundamental education necessary to enable him to grasp such a complicated and technical business as the Swedish system. And even if he did possess sufficient education to start with, he would not get a chance of exercising his powers under the present scheme. The latter remark is specially applicable to those who supervise the work, the superintendents of gymnasia; in view of the intricacies of the system, and by reason of their responsibilities, their training is absurdly inadequate both in point of time and thoroughness. Placed beside their Swedish or Danish colleagues they would simply look foolish. A knowledge of anatomy, physiology and hygiene cannot be acquired in a few weeks, and a mere smattering of these sciences may be a dangerous[1] thing when physical training is run on Swedish system lines. But lest I be accused of criticizing on grounds where the layman (in a medical sense) cannot join issue, I hasten to add that the ordinary medical officer is no more fitted to be a physical training expert than is his combatant comrade. The former may be a brilliant pathologist, and the latter may know how to conduct an assault-at-arms, but neither of these accomplishments will go any distance towards a proper understanding of the principles and precepts of the Swedish system. So, until we have a number of physical training officers instructed on the Scandinavian model—and there should be little difficulty about this—we must be content to hear our system decried and misjudged, and see it more or less inadequately and inefficiently applied. Why spoil a fine ship for a ha'porth o' tar?

[1] Frequently it is also laughable. It was some time before I realized that our teaching of elementary science in the Head-quarters Gymnasium in Aldershot was a near approach to a joke. One day the disillusionment came when a certain very studious N.C.O. complained to me of a pain in his back. When I asked him the reason for this, he replied in all sincerity: "Well, sir, I think I've strained my renal region, and it's worrying me something awful round the splanchnic plexus!"

Echoes from the Past.

AN EPISODE OF THE SECOND AFGHAN WAR, 1878-79.

By Colonel J. M. BEAMISH.

Retired Pay.

This Campaign may be considered, from a general point of view, as a side issue of the Russo-Turkish Conflict of '77—'78. Russia's answer to England's introduction of Indian troops to the Mediterranean, and her checkmate to Russia's attempt to occupy Constantinople at the end of the war, was intrigue with the Ameer of Afghanistan; and the effort of the Government of India to meet this countermove by the dispatch of the Neville-Chamberlain Mission to Kabul having failed, no resource was left to them but to bring the Ameer to account for receiving overtures from Russia, and for his failure to observe the conditions of an existing treaty with the British Government.

It was at this crisis that about mid-October, 1878, the Battery of Garrison Artillery—13/8 R.A. under the designation of the time, and the last to be stationed on the Malabar Coast at Cannanore—was placed under orders with the writer in medical charge, then serving with his Regiment (48th) 1st Northamptonshire at the same station, to form one of three divisions of a siege train proceeding via Sukkur on the Indus to Quetta, and thence to Kandahar, as part of the Southern expeditionary force under the command of Sir Donald Stewart.

It may well be supposed that, in so remote a station, then in communication with Bombay and the outer world only by a weekly coasting steamer, the means of supplying even an incomplete medical equipment were scanty, and of providing camp requisites for officers in an emergency nil.

However, Indents "to be completed hereafter" were submitted for various items of marching outfit, and the regimental and other stores having at short notice supplied all that was possible, the battery sailed on the 22nd for Bombay and Karachi—1,000 miles—in the I.T.S. "Tenasserim," arriving at the latter port on October 28.

Here we were compelled to rest on our oars till November 25—a whole month—awaiting orders, and during concentration of the field force at Sukkur. Here also the long wait enabled us to complete some necessaries of personal outfit, purchase ponies, &c., Fortunately, too, a short time before, the then new Indus Valley

railway was linked up with Karachi, so that we were enabled with comparative ease to join the base of supplies at Sukkur on November 27, and here we remained encamped till December 16.

In the interval, during which several Punjab details passed through, a great number of camp followers and transport animals—elephants, camels, and draught bullocks for the siege train among them—had accumulated. Two divisions of the siege train were present, 13/8 and 16/8 R.A., the first, as above stated, being in the writer's medical charge.

13/8 was equipped with 24-pounders, drawn by bullocks and obtained most of its medical and general supplies, camp equipage, and personnel on indent from Multan.

The sanitary condition of the camp at Sukkur was far from satisfactory, though every effort was made to mitigate the evils incidental to the gradual concentration of troops, followers and transport animals within a limited area, near a native town ignoring the most elementary hygiene, and during the prevalence of raw, damp weather in the Indus Valley at midwinter, to all of which occasional rain was superadded.

One officer suffered from dysentery and was left, on departure of his unit (13/8), apparently convalescent attached to 16/8 R.A. which was destined to follow, but, under altered arrangements, did not proceed from Sukkur, 13/8 marching out first.

Ague, as well as dysentery, the first especially, was rife among the troops during the halt at Sukkur, to such an extent in one British Infantry Regiment as to prevent its dispatch to the front. 13/8 R. A. (siege-train unit) marched out with several men convalescent from fever, carried in doolies the first day; but, with the change from the unfavourable hygienic conditions at Sukkur to the invigorating breezes of the interior, they had quite recuperated after the second day. The men had, moreover, come, as stated, from the particularly enervating climate of the Malabar Coast.

Four ordinary marches (December 16 to 20) brought the Battery, via Shikarpur—half way, and head-quarters of the Civil administration of Upper Sind—to Jacobabad, where a day's halt was made, December 21 to 22.

The plains of Upper Sind bordering on the Indus are extensively flooded during the heavy rains, at other times scanty, which fall during a short period in the late autumn, the flood rising to a height of 3 ft. or more, as proved by mud marks on the trees.

In the Kutch desert, and elsewhere to a lesser extent, during the later drying up, the whole plain presents a remarkable

appearance in what is called locally the "Put," that is the shrunken clay surface, intersected with cracks or minor crevasses, and, in most places that are not sandy or widely crevassed, facilitating the movement of traffic over the hard-baked level ground.

Jacobabad, our halting ground at this juncture, founded by General Jacob in 1847, and till recently head-quarters of three regiments of Scinde Horse, is encircled by a deep fosse to intercept storm-water, and its sun-proof bungalows, further protected by leafy trees, suggest that the designers of such massive, almost cyclopean, buildings thought originally they had come to stay. The station is now, however, under newer dispositions, shorn of its ancient prestige, its traditions surviving only with the 35th Scinde Horse (late Bombay 5th Cavalry), now a movable unit, and no longer in occupation of its old head-quarters.

Here we were on the confines, within a few miles, of the Kutch Desert, one of the hottest regions of the globe, the station registering in past years a temperature of 126° F. in the shade during the hottest months. It has a wide range of temperature at all seasons, from frosts at night in midwinter to intense heat of the sun through mid-hours of the day.

Desert March—En Route to Dadur, December 22, '78 to January 3, '79.

We resumed our march on December 22, and next day crossed the Baluch frontier. The progress of the guns with bullock draught was painfully slow, even though this was facilitated by laying brushwood over the sandy reaches in places, and by manipulation of the gun-carriages by the gunners themselves. In the same way the heavier 40-pounders ahead of us in the Bolan Pass were literally hauled up the river's bed with the aid of escorting infantry, after the elephants had given out through foot soreness. Sandy ground when it occurred implied slower and shorter marches, but one march towards the end (9th day) with better going over the "Put" extended to 27 miles, through a waterless region, between 3 p.m. one day and 8 a.m. the next, when extremes of heat and cold were very noticeable. Dadur, ten marches (= 100 miles) from Jacobabad, and about 150 miles from Sukkur on the Indus, was reached on January 3, 1879.

We had so far the usual proportion of doolies with Kahars, whose occupation sometimes extended to burying camels, or repairing roads, in standing camp. The Kajawas borne by the

camels were cumbrous and heavy, and the same may be said of the doolies, so that man and beast alike were overloaded, but with more disastrous results for the camel.

The general health was good during our period of duress in the desert, and it seemed that, in spite of extremes of temperature, the tonic effects of the first move out of Sukkur Camp were daily intensified.

In such a locality it became imperative to supervise closely the drinking-water supply from wells near villages—previously inspected, however, under Q.M.G's. authority—and accordingly, at all the halting grounds chatties filled with drinking water immediately after arrival were treated with alum, procured on emergency from the local bazaar, and stood to cool—an expedient, it may be observed, always feasible within Indian limits, and to which, as well as to the atmospheric conditions, the writer attributes a high degree of salubrity in the Battery personnel under rather trying circumstances.

The most conspicuous and painful object during the desert march was the camel, struggling with starvation on the scanty scrub, or collapsing under heavy loads, dying daily by the score, and encumbering the track by his bulk and putrescence. At Dadur a dead camel was found in a nullah which supplied the drinking-water. Boxes of ammunition were seen hourly dropped on the plain, and at one spot on the wayside a mound indicated the grave of an isolated transport officer, who found the burden and heat of the previous day too much for him. A pariah dog prowling about at night dragged out a kerosine lamp from under the fly of a Cabul tent, to satisfy his voracious appetite.

The situation at Dadur looked comparatively inviting on arrival, in sight as it was of snow on the mountains, and of the mouth of the Bolan pass, three miles distant, whence issued a copious supply of pure water from the Bolan river, distributed by conduits over the low ground, for irrigation of crops and domestic purposes. After some time, however, fever recurred to a slight extent, and a fatality from high temperature was once expected, but the patient, a gunner, rallied, and his convalescence was a subject of congratulation to the man by General Phayre when inspecting the camp about the same time.

Kandahar having unexpectedly submitted early in January, 1879, and a siege-train, as such, being no longer necessary, our long wait at Dadur till February 25—nearly two months—was determined by some hesitancy on the part of the authorities as to further disposal of 13/8 R.A. At length it was considered that

there were already enough mouths to feed under the then slow and imperfect means of transport and communication over a stretch of 400 miles from the Indus to Kandahar, and so a middle course was adopted, the personnel of the battery, the writer included, being ordered back to India, and the guns parked at Quetta.

At this early period of the campaign it should be borne in mind that Quetta was little more than a Brahui village, only occupied the previous year (1877), and that the Sibi-Hurnai line connecting with the Indian system did not then exist, though a few months afterwards it was pushed on rapidly from the Indus Valley Railway, at a point below Sukkur, at the rate of a mile a day, and supplemented by an alternative line through the Bolan pass to Quetta and even beyond, as far as Chaman in later years—thus facilitating greatly the transport of troops and material in the later phases of the campaign (1879-80), and ever since.

Return March.—The battery personnel, leaving Dadur on February 25, 1879, did not retrace their former route through the desert, but followed a more direct newly laid plough-track via Bagh, shorter by some miles than the Eastern route, by which they came, and remote from villages, as far as Jacobabad. It was on one of these marches that a strange incident, not unknown elsewhere, happened; when, in the darkness of early morning, the main party missing the track at some distance from the camp which they had just quitted, and again recovering the track in daylight, took a backward course through misjudging the cardinal points, so that, after a march of several miles, the party actually struck the camping-ground, easily recognized, which they had left some hours before—having thus moved in a semi-circle and doubled a march of sixteen miles to no purpose.

The writer, fortunately, did not share in this mishap, being saved from it by attention to his special duties at the last moment, and followed the right course with the Battery transport and officer in charge.

We re-crossed the frontier near Jacobabad on March 5, ten marches from Dadur, en route to Bombay and Deolali, via the Indus Valley railway to Karachi, all of us much benefited by the five months change to the frontier, and without the loss of a man or a follower. At Dadur a few followers suffered from frost-bite, and an officer was attacked by dysentery at Sukkur as noted.

We had special instructions from Army Head-quarters to distribute quinine, from an extra supply, to natives other than our own followers requiring it medicinally, and several of them from time to time took advantage of the concession.

Appendix.

Incidentally to the mention of Sind, I may be permitted to refer to the adjacent minor State of Kutch Bhuj, whose capital, Bhuj itself, was once a British frontier station up to the time of the annexation of Sind and expropriation of its Ameers, after Lord Napier's Campaign of 1843.

Bhuj lies directly south of Karachi, approached thirty miles inland, from Mandavi, a port of call for weekly steamers plying between Bombay and the former port. The occasion of the writer's visit to Bhuj in the cold season of 1898—twenty years exactly after the events above recorded on the Afghan frontier—was an official inspection from Bombay of the Native Regiment (Indian Army) stationed there, during which one took special note of the gradual extension of British conquest all along the Indian frontier.

This small State was administered by a native prince, then a young man versed in English social customs, and, as well as his younger brother, speaking our language perfectly.

The European cemetery at Bhuj is a standing well-preserved memorial of our occupation in the twenties and thirties of the last century, all other European buildings having by this time vanished. The station comprises, besides the N. I. Lines, the Raja's palace and a picturesque old Indian fort, with investing curtain and battlements, crowning a hill of considerable height.

The surrounding country abounds in game of all sorts, big and small, in the pursuit of which the Raja gave every encouragement, personal and other, to the British officers, and even shared the hospitality of their mess—a truly Arcadian life for them which they were always loth to exchange for the routine of another station.

Reviews.

BACTERIAL DISEASES OF RESPIRATION AND VACCINES IN THEIR TREATMENT. By R. W. Allen. London: H. K. Lewis, 1913. Pp. x and 236. Price 6s. net.

A good deal of the matter contained in this volume has already appeared in serial form in the *Journal of Vaccine Therapy*. The work commences with a general account of the bacteriology of respiratory diseases, and of the technique which the author recommends for its "elucidation." Some interesting statistics are given of the frequency with which various organisms are found in coughs and colds, the principal ones being *Bacillus influenzæ*, *Pneumococcus*, *Micrococcus catarrhalis*, *B. septus* and *Streptococci;* the writer shows how the prevailing type varies from year to year according to the epidemic present at the moment. The chapters on treatment commence with some observations on the necessity for remedying gross defects such as adenoids, &c., before attempting vaccine therapy; in this we agree, but we do not hold with his recommendation of the routine use of the nasal douche, which not uncommonly by itself serves to produce or keep up a chronic catarrh. With regard to doses Dr. Allen recommends those which produce a definite reaction. In our experience one can usually get good results without increasing the patient's discomfort, and it is doubtful if many patients of the earning classes would care, in the case of a cold at any rate, to submit to the increased inconvenience which high doses produce. The charts of the chest, which the author shows in connection with his chapter on acute bronchitis, are a distinct improvement on the older forms; they give much more room for the record and can be read more easily.

In the chapter on phthisis Dr. Allen lays great stress on the necessity for dealing with the mixed infection when it is present. There is no doubt that by using a vaccine of the complicating organism one can very often bring a rapidly advancing hectic case into a manageable condition. With tuberculin, as with other vaccines, Dr. Allen aims at producing a reaction, mild maybe, but still reaction, and he scoffs at any idea of mobilizing the tubercle bacillus. Our experience with guinea-pigs is that high doses of tuberculin will produce extension of the disease and that the extension is proportionate to the dose. The matter is one which will have to be put to the test of statistics in the end; these are hard to get, but it seems unlikely that the best method of administering tuberculin will be determined in any other way. Dr. Allen's book is written by a practical worker and an enthusiast. It will be read with interest and profit by all those who are engaged in the practice of vaccine therapy.

W. S. H.

LESSONS ON ELEMENTARY HYGIENE AND SANITATION WITH SPECIAL REFERENCE TO THE TROPICS. By W. T. Prout, C.M.G., M.B., C.M. (Edin.). Third edition, J. and A. Churchill, 1913. Price 2s. 6d. net.

This little work is arranged as fourteen lessons, which have been compiled from a series of lectures given by the author and form an

elementary text-book for the use of schools in the Tropics. The aim has been more especially to deal with the sanitary problems of tropical life, and for this purpose these lessons will undoubtedly have their use.

The lessons are written in a pleasant, conversational style and impress the reader with the individuality and experience of the author. For a small book the illustrations and diagrams are lavish, remarkably good, and well chosen.

Several of the lessons are devoted to elementary physiology, which is to be commended in works of this nature, as it forms a sound basis for the study of hygiene.

The lessons concerning the causes of disease and those on the animal parasites are so clear and well arranged that anyone quite unacquainted with the subject will find no difficulty in acquiring a sound and profitable knowledge.

The author is to be congratulated on placing the results of scientific work in a popular and easily understood form, an achievement which is generally allowed to be somewhat difficult.

W. W. O. B.

MALINGERING AND FEIGNED SICKNESS. By Sir John Collie, M.D., J.P. London: Arnold, 1913. Pp. 340. 8vo. 44 illustrations. Price 10s. 6d. net.

In this book Sir John Collie has embodied the experience gained during many years as medical referee on workmen's compensation cases. The work is written with a view to assisting medical men in civil practice who have to decide whether a workman is really suffering to the extent which he claims as a result of some trade injury.

The chapters on medical examination contain much sound advice and many useful hints; these should be studied by every young medical officer. Many cases are quoted in full to illustrate various points, and although these mostly refer to claims for compensation in civil cases, still a perusal of them may materially assist a medical officer in deciding the constantly recurring problems, as to when a man, who has suffered some injury, is fit to return to duty, or as to whether a patient should be invalided out of the service or not.

This book may be regarded as a classic on feigned disease, and is practically the only book of its kind in English; it should prove of great assistance to all R.A.M.C. officers.

C. E. P.

CHLORIDE OF LIME IN SANITATION. By Albert H. Hooker, Technical Director, Hooker Electrochemical Company. New York: John Wiley and Sons, 1913. Pp. v. and 231.

The research department of the Hooker Electrochemical Company have collected in this book all the data relating to the use of chloride of lime in sanitation. The first part of the book shows how this inexpensive chemical is one of the most valuable and economical agents available for the protection, in various ways, of the public health. Each chapter deals with a different problem of sanitation illustrating the advantage of using chloride of lime in each case. The second part of the book contains

abstracts of the various books and papers dealing with the use of chloride of lime, and by means of these the subject can be traced further to the original sources of information.

A perusal of this book would amply repay anyone who requires information as to the various uses of chloride of lime, more especially in connexion with the purification of water, and the disinfection of sewage, as the information herein detailed would be otherwise difficult of access.

The subject matter is well put together and written in the vigorous American style, while the chapter of abstracts forms a valuable table of reference. H. B. F.

Notes on Sanitation for Regimental Sanitary Orderlies and other N.C.Os. and Men. By Assistant-Surgeon V. J. Lopez, Indian Subordinate Medical Department. Madras: Higginbotham and Co., 1912. Pp. iv. and 66. Price 1s. net.

This little book, arranged in six chapters, gives in simple and non-technical language the general principles of disease prevention. It is written on the lines of the old official manual of sanitation, but though arranged in much the same way it does not cover quite so much ground and is not so clearly put. Several points of importance to sanitary orderlies have been omitted, e.g., a paragraph on the life history and breeding habits of flies would have been a useful addition. The few sketches illustrating the text are somewhat crude, but fulfil their purpose. The book presents many points in sanitation, which should be assimilated by all N.C.Os. and men, and should serve as a useful guide for sanitary orderlies in carrying out their duties.

H. B. F.

Current Literature.

Culture of Malarial Parasites.—Gurko and Hamburger (*Zeitsch. f. Hyg. u. Inf.*, May, 1913, p. 248) withdrew 10 c.c. of blood from the veins of a boy suffering from malaria contracted at Schagali, a malarious district on the Trans-Caucasian Railway. After centrifuging, they mixed 2 c.c. of the serum with $\frac{1}{10}$ c.c. of 50 per cent glucose solution and then placed carefully at the bottom of the tube $\frac{1}{10}$ c.c. of the red corpuscles.

The venesection was performed just before the onset of pyrexia; ring forms, and crescents only were present. In the cultures numerous merozoites were found, making it clear that schizogeny had taken place in the test tube. The second and third subcultures showed multiplication of the parasites, but in the fourth they had disappeared.

C. B.

Laboratory Typhoid Infection Averted by Vaccine.—Vincent and Haibe (*Comptes Rendus de la Société de Biologie*, May 16, 1913, p. 998) report an instance in which a laboratory attendant sucked into his mouth $1\frac{1}{2}$ c.c. of a thick emulsion of the living typhoid bacillus; two days later

he received his first dose of antityphoid vaccine prepared by Vincent. In twenty-five days he was given four injections altogether. Forty-three days after his last dose his serum was still strongly bactericidal and agglutinative. At no time did he evince any of the signs or symptoms of enteric fever. Vincent states that this is the seventh case in which a massive laboratory infection with the typhoid bacillus has been arrested by vaccination. He quotes the instance of a physician, who contaminated his lips with a trace of typhoid culture, yet he contracted the disease, the onset of which came on fifteen days later, notwithstanding that he disinfected his mouth and lips with alcohol for twenty minutes, and that he had recovered from an attack of enteric fever seven years before.

Another such example of laboratory infection causing enteric fever has come under his observation. Hence antityphoid vaccination can protect against laboratory infections with the *Bacillus typhosus*.

C. B.

Formalin in the Prevention of Blisters of the Feet.—Eiguchi (*Zeitsch. f. Hyg. u. Inf.*, April, 1913, p. 45) has tested the comparative merits of 1 to 5 per cent solutions of chromic acid, and undiluted formalin for the purpose of hardening the skin of the feet of Japanese troops.

The application of formalin (undiluted) for three or four days greatly reduces the number of casualties arising from blisters and abrasions of the feet. He admits, however, that sometimes the tanning process goes too far, and the skin splits. The chromic acid solutions are not quite so effective. He quotes Fischer, who has used a 15 or 20 per cent formalin solution in hundreds of cases, and has not met with dermatitis, or fissuring of the skin.

C. B.

The Detection of Bacillus Typhosus in Water.—Kaczynski (*Zeitsch. f. Hyg. u. Inf.*, April, 1913, p. 188) puts the candle through which he has passed several litres of the suspected water, into ox-bile which has been sterilized in the autoclave, incubates at 37° C. for twenty-four hours, and then makes plates. In this way he recovered the *B. typhosus* which he had added in the proportion of 8 bacilli per litre in the presence of 175,000 times as many water organisms.

On one occasion, by the addition of crystal violet and caffein to the bile, he succeeded in isolating the *B. typhosus* from sewage.

C. B.

Tuberculosis.—Landis (Seventh Report of the Henry Phipps Institute, 1913) gives the results of dispensary treatment of tuberculosis. Of patients who applied for treatment at the Phipps tuberculosis dispensary in 1904, there were 915 in whom a positive diagnosis of tubercle was made. In 1911 there were 595 who could be traced, and of these 380 were known to be dead; these cases died in the following numbers taking consecutive years from 1904, 111, 116, 45, 27, 13, 19, 20, 5. Of the remainder 102 were reported to be free from symptoms, and 107 were at work. The author draws attention to the risks of waiting till the diagnosis is imposed on one by gross signs and symptoms. Craig, in the same report, gives the results of an investigation into the habitations of

patients who died from tuberculosis in the fifth ward, Philadelphia. He finds that a great proportion of deaths occurs in a relatively small percentage of houses, and that house infection is the most fruitful source of the disease.

In over a quarter of the cases among children the possibility of house infection was clearly demonstrated. The author concludes that efforts at prevention among children must be concentrated against the human rather than against the bovine sources of infection.

W. S. H.

Wounding Effects of the Pointed Bullet.—Stabsarzt Dr. Lotsch (*Kugel und Schrot*, No. 10, May 7, 1913) contributed a paper to the *Deut. med. Woch.*, in which he summarized his observations of wounds inflicted by the pointed bullet.

The Turkish infantry was armed with the Mauser infantry rifle, models 1890-1893. The rifles were originally constructed to take the ogival bullet, but had been adapted for the pointed bullet. The cartridge has a calibre of 7·65 mm. (8 mm.), the bullet weighs 10 grm. (154 grains), its muzzle velocity is 840 m. sec. (860) and its muzzle energy 359 m.kg. (377). The figures in brackets are those for the German Army rifle. The cavalry carbine and machine guns used the same ammunition.

The centre of gravity of the pointed bullet lies near the base; this tends to set up a pendulum-like motion, also to produce a rotation round its transverse axis on meeting any slight resistance.

In wounds of the soft parts, the wound of entry is mostly the same size as the calibre of the bullet, and being small it may easily be overlooked; if the wound does not become septic it heals rapidly under a scab leaving a minute scar. The wound of exit is only slightly larger than that of entry, and it is often difficult to tell one from the other.

Wounds of blood-vessels have been more numerous than in former campaigns. In many instances the pointed bullet appears to produce severe injury to the vessel without any obvious signs at the time of infliction, but which gives rise to secondary hæmorrhage later on. Owing to the small size of the track there is usually little bleeding from the wound, i.e., if the man survives to reach the dressing station. In future campaigns the ligature of arteries will rarely be required at the dressing station.

Injuries to large nerves also appear to be more numerous than formerly.

Gunshot fractures of bones were almost always distinguished by extensive splintering of the bone; in the femur, tibia and humerus, the length of the splinters was as much as 7½ in. In some cases the wound of exit was very large owing to fragments of bone being driven out along with the bullet. The ends of long bones were generally cleanly perforated, and if not septic they healed up quickly.

Wounds of joints, if not septic, healed up quickly and without leaving any interference with the movements of the joint.

Relatively few wounds of the head reached the line of communication hospitals; most of them were septic. In some cases the bone was clearly perforated; in others there was much splintering, and fragments were driven into the brain tissue. The outer table was less damaged than

the inner at the wound of entry; at the wound of exit the condition was the reverse.

Only one wound of the spine and no wounds of the heart reached the line of communication hospitals.

Wounds of the lung, inflicted at medium ranges, mostly healed up rapidly and without producing complications.

Few abdominal wounds reached the line of communication.

On the whole, the wounds produced by the pointed bullet do not materially differ from those produced by the ogival bullet in former campaigns. If anything, the pointed bullet shows a greater tendency to lodge in the tissues.

(Note.—The writer was employed in a Red Cross unit at Jamboli and Kirk Kilisse, and therefore only saw the men who survived a journey of several days after being wounded.—C. E. P.)

C. E. P.

Wounds of Modern Projectiles.—Dr. v. Frisch (*Das Rote Kreüz*, Vienna, No. 3, 1913) read a paper on the above subject, based on his observations while employed with an Austrian Red Cross unit in a hospital at Sofia during the Balkan war. He treated about 900 wounded from the battles of Kirk Kilisse, Lule Burgas, and the fighting round Adrianople. Some of them were admitted within two days of being wounded, others had been many days on the journey. The proportion of wounds inflicted by different missiles was ten by rifle bullets, two by shrapnel, and one by fragments of shell; the small proportion of the latter category is due to the fact that only a few of them survived to reach hospital. In one case a man had only been grazed by a splinter from a shell, but the whole outer covering of his thigh had been torn away and had left the lacerated muscles exposed. A man may happen to be quite close to the spot where a shell explodes and yet not be hit, but he is usually thrown to the ground, loses consciousness, and on coming round is found to be suffering from severe concussion of the brain or spinal cord. Shrapnel bullets make a large tearing wound, and frequently remain embedded in the tissues or just under the skin on the opposite side of the limb.

Rifle bullets lodged in the body need not be removed unless they are giving rise to pressure symptoms or the track becomes infected and an abscess forms round them.

The Turkish 7·5 mm. pointed bullet, at near ranges, 100 to 200 yards, inflicts a very serious wound, damaging all the tissues very extensively. At ranges of about 1,000 yards, it perforates soft tissues cleanly and the wound heals up quickly. One interesting point is that at the moment the man is hit with the pointed bullet he feels no pain. Thus several men who were shot through the lung were unaware of the fact till they began to cough up blood; in another case a man did not know that his leg had been broken till he attempted to dismount from his horse.

Even the brain is not much damaged by being perforated by the modern pointed bullet. In nearly all cases the greatest damage is caused by splinters of bone; these may be driven into the brain substance or may divide an artery or nerve.

Among the curiosities in wounds, the following may be mentioned: An officer was wounded in the lungs, but did not know it till he coughed

up the bullet; an officer, while charging and cheering his men on, was shot through the tongue without any other part being touched; a soldier was admitted with a bullet under the skin of his back, but could not point out the wound of entrance, this was finally found to be in the external meatus, the bullet having entered here and travelled down the neck, becoming lodged under the skin of the back; in the case of another man the bullet struck a one-franc piece in the man's purse and drove it into the subcutaneous tissue, the bullet itself remained in the purse.

C. E. P.

Surgery in War.—At the forty-second meeting of the German Society for Surgery (*Berl. klin. Woch.*, April 28, 1913) a discussion took place on wounds in war and their treatment, with special reference to recent experience. Goebel quoted some of his observations with the German Red Cross unit in Tripoli. In general, the Italian 6·5 mm. bullet only caused a moderate amount of damage; most wounds, even those through the neck, healed up quickly and without complications. A new kind of wound was that inflicted by aeroplane bombs; some of the wounds were caused by splinters from the bomb, but most of them were due to the contained shrapnel bullets; the wounds were mostly situated on the lower extremities and lower portion of the body. The use of tincture of iodine or mastisol as skin disinfectants constitutes a great advance in field surgery, as by this means the necessity for using water in dressing wounds is eliminated.

Coenen and Thom, in Athens, treated 665 patients suffering from gunshot wounds; only seven of them died. About three-quarters of the whole healed up without complication. Among twenty-three wounds of joints four were resected and one was amputated. Of ninety-four compound fractures eighty-three healed by primary union; in one case amputation was performed. Five cases of aneurysm were operated on after the tumour had become encapsuled; if the peripheral end of the cut artery does not bleed the ends should be united by suture.

Kirschner observed 1,000 cases in Sofia and close to Adrianople; the further from the battlefield the better the results. One-third of the wounds of bone, 37 per cent of wounds of joints, and 50 per cent of wounds of blood-vessels were septic. This unfortunate complication was mainly due to the prolonged transport on ox-wagons. Many of the dressings had slipped away from the wounds. The dressings should be fixed in position by mastisol; when this was used the dressings remained in position.

Frank worked with the Greeks in a line of communication hospital. Dressings were satisfactorily applied at the front, but too much tincture of iodine was used. Mastisol possessed an advantage over tincture of iodine in that it fixed vermin as well as bacteria.

Pochhammer said that the prognosis of a wound depended very largely on the efficiency of its first dressing; among some 500 wounded and neglected Turks almost every wound was septic.

Colmers, speaking of the pointed bullet, said that the wounds inflicted by it were in general much the same as those caused by other small bore bullets. Owing to its tendency to turn on its transverse axis the track was inclined to be somewhat wider, and there seemed to be a greater

liability to damage of nerves and vessels. When the pointed bullet strikes a bone causing a fracture it frequently lodges in the wound, and in many cases is deformed. In wounds of the skull it causes considerable splintering of bone.

V. Oettingen said that every wound must be regarded as contaminated from the time of its infliction; hæmorrhage should not be checked too soon, as it tended to wash out infected matter. The absence of dressings was responsible for the occurrence of tetanus in 1 per cent of the 63,000 Russians wounded at the battle of Mukden. Wounds are liable to become infected by the man himself or by unskilled assistants. Plugging of wounds is done because of a foolish dread of hæmorrhage; it should be clearly understood that hæmorrhage is either fatal or harmless. He advocates a triple fixation (1) of the skin bacteria; (2) of the damaged part; (3) of the patient wherever he may be lying, i.e., if possible do not remove him from the stretcher till he reaches a stationary hospital.

Koler referred to his results in the treatment of gunshot fractures of the diaphyses of long bones. He laid stress on the importance of complete immobilization, and recommended extension in the case of fractures of the upper extremity, and plaster of Paris bandages for those of the lower extremities. He tried resection of the injured bones instead of amputating the limb, but the results in fractures of the thigh were not satisfactory.

Lotsch summarized his experiences in the Balkan War in regard to wounds of blood-vessels as follows: The pointed bullet frequently causes wounds of blood-vessels, but, unless one of the larger vessels is wounded when the hæmorrhage may quickly prove fatal, there is usually little bleeding. A hæmatoma generally forms around the site of the injury; after a few days pulsation may be detected in the swelling which thus forms a false aneurysm. All severe wounds, the track of which passes close to larger arteries, should be regarded with suspicion even when no hæmatoma is evident, and, on account of the danger of detaching a portion of the clot and so causing an embolism, the part should, as far as possible, be immobilized, especially if the man is to be evacuated. Ligatures should not, except in really urgent cases, be applied at dressing stations.

Dreyer saw thirty-one cases of gangrene of the foot among Turkish soldiers; these men were wearing laced boots and putties during cold, damp weather, and could not take their boots off. The temperature was not low enough to cause frost-bite in itself, and Dreyer thinks that the gangrene was caused by the wet putties shrinking and so causing sufficient constriction to impede the return circulation.

C. E. P.

The Equipment of a French Ambulance in Bulgaria.—Dr. Rebreyend (*Le Caducée*, No. 7, April 5, 1913) was placed in charge of a French ambulance organized by the "Société de secours aux blessés" for the treatment of wounded Bulgarian soldiers in Philippopolis, and was given a free hand in selecting the surgical equipment. He gives a graphic description of the difficulty of doing so, especially in a very limited time and without exact knowledge as to what articles could be obtained locally after arrival. For the guidance of others he gives

a complete list of instruments actually taken, with remarks as to the utility or otherwise of the different articles. He took a very liberal supply of forceps, scissors, scalpels, &c., which proved very wise, as each section of the ambulance required a separate set for everyday dressings. A complete set of instruments for operations on bones was taken, and experience showed how necessary these are. A very liberal supply of rubber operation gloves was included in the outfit and proved most useful; every pair was used up by the time the ambulance was broken up.

As regards dressings, Rebreyend did not in the least know what quantities should be taken. He therefore asked the accountant of the Lariboisière hospital, Paris, what were the average quantities of certain dressings used each month for 200 surgical beds. The reply was: Absorbent cotton wool, 264 lb; plain cotton wool, 288 lb.; gauze for compresses, 16,000 yd., or about 670 lb.; prepared muslin (? gauze), 1,640 yd., or about 85 lb.; oiled silk, 27 yd. Rebreyend based his calculations on these figures and was satisfied with the result.

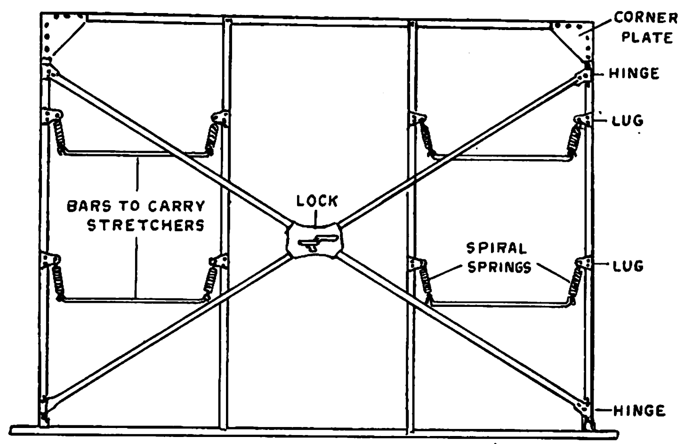
He also took 200 doses of antitetanic serum, which was sufficient to allow of every case, in which the wound was soiled, receiving a prophylactic injection of the serum. Not a single case of tetanus occurred in his ambulance.

In cases of deep-seated suppuration and old fistulæ he found a 10 per cent solution of chloride of zinc invaluable; under its action suppuration speedily ceased, pain and congestion disappeared, and the wound rapidly healed. Tincture of iodine was also largely employed with satisfactory results.

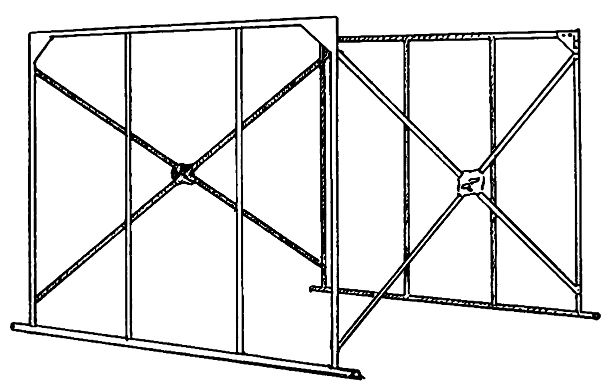
C. E. P.

Kärrner's System of Transport for Lying Down Sick and Wounded.—Hagemann, Commander of the Krieger-Sanitätskolonne of the Red Cross at Lübeck (*Deut. Kolonnenführer*, May 1, 1913), tried this apparatus during the annual exercises of the Lübeck Red Cross detachments and found it in every way satisfactory. The apparatus consists of two quadrangular frames of section girder steel, their outside dimensions appearing to be roughly: Height 5 ft. 10 in., width 6 ft. 6 in. The frames are riveted at their upper corners, where they are stiffened against lateral strain by means of corner pieces bolted to them. The lower ends of the uprights seem to be socketed into the bottom piece which is slightly longer than the top bar. Each frame is subdivided into three divisions by means of two uprights fixed to the upper and lower cross bars by rivets, and which are placed at intervals of 2 ft., wide enough to accommodate a stretcher with room to pass. Four flat lugs of steel, bored at their inner ends to receive hooks of spiral springs, are riveted by their outer ends to each upright, in two pairs looking inward. They are placed, the two lower pairs 2 ft. above the ground, and the two upper pairs 1 ft. 6 in. from the upper bar. Spiral springs are hooked into the holes at their flat ends and four round steel bars attached to the other ends of the springs are slung, two in each outer space, to carry stretchers. At the top and bottom of the outer uprights are hinges which carry diagonal bars of steel, two on each side. These bars are capable of being swung out at right angles to the frame in order to articulate with similar bars attached to the second frame, and so to form a cage capable of

carrying four stretchers in two pairs with an alley way between them. They interlock in the closed position, when the apparatus is not in use and with the corresponding diagonals of the second frame when in use, by means of a lever lock. The apparatus is thus capable of carrying four stretchers in two series, leaving a space between the series for access to



ELEVATION OF SINGLE FRAME CLOSED FOR STOWAGE



BIRDS EYE VIEW OF FRAMES LINKED UP FOR USE
(SPRINGS AND BARS OMITTED)

Kärrner's system of transport.

the patients. The weight of the whole apparatus is 165 lb. A goods wagon can carry forty pairs of frames packed up; this number would be sufficient to adapt twenty wagons for carrying 160 lying down patients. It can be used in a variety of ways, but would be especially useful in railway transport of wounded

Its construction is very simple, the only demerits being its irreducible dimensions of 6 ft. 6 in. by 5 ft. 8 in. and the entire dependence of its stability upon two lever locks.

H. E. R. J.

Balkan Campaign.—Regimentsarzt Dr. Wimmer (*Das Rote Kreuz*, Vienna, April 28, 1913) has published a lengthy report of his experiences as surgeon in charge of an Austrian Red Cross Society's unit.

On arrival in Constantinople, just before the battle of Tatchaldja, his party were assigned two wards, each containing seventy beds, in the Tashkishli barracks. The buildings, in which a number of other foreign medical units were also at work, contained altogether 1,300 wounded. The total number of wounded treated by this unit was 650. On admission most of the wounded were in a state of extreme exhaustion. Although the battlefield was only thirty miles from the city and the communications included a railway in working order and three inferior roads, as well as an open sea route, yet owing to the absence of any organized system of evacuation the average time which elapsed between being wounded and being admitted to hospital, was two to three days. Many of the wounded had not been dressed before their arrival in hospital. Among the wounds treated by this unit, 58 per cent were caused by rifle bullets and 42 per cent by shrapnel; wounds of the extremities accounted for 78 per cent of the total, and wounds of the left side were much more frequent than those of the right. Wounds of the lungs, especially if only one lung was injured, healed up quickly without causing serious trouble. Wounds of the skull made up 2 per cent of the total. The most troublesome wounds were the compound comminuted fractures into the elbow and knee joints; 70 per cent of all wounds were extremely septic on admission.

At the height of the cholera epidemic about 3,000 men were attacked daily. As there was not a sufficient number of stretchers to carry the cholera patients from the train to the cholera camp, the sick were simply rolled down the embankment. Improvement was, however, soon affected in the arrangements for cholera patients. Wimmer volunteered for duty in a cholera hospital; here he tried the cholera serum prepared by the Vienna serological institute in twenty-five cases, but does not give any opinion as to its value.

C. E. P.

Balkan Campaign.—The April, 1913, number of the *Archiv. de Méd. et de Pharm. Milit.*, contains further notes by Professor Le Fort on his visits to the Bulgarian and Servian hospitals during the first fortnight of November, 1912. In speaking of the evacuation of wounded he says that in most of the ox-wagons eight wounded men were placed. In spite of the extreme discomfort of the long journey the mortality en route was only 1 per cent. He strongly favours the application of tincture of iodine as soon as possible, and says that the dressing should be a very large one to prevent the subsequent occurrence of sepsis. Although the suffering was aggravated by early evacuation he says that the patients soon got over the bad effects of the journey when they were admitted into a comfortable hospital. The experience of this

war has emphasized two points, viz., the importance of immediate evacuation of wounded to properly equipped hospitals, and that surgical interference should, if possible, not be attempted at the front.

C. E. P.

Treatment of Crushed or Frozen Extremities with Suction.—Stabsarzt Koehler (*Deut. Militärärzt. Zeit.*, April 20, 1913) reported two cases successfully treated on the lines suggested by the late Professor Noeske, who held that gangrene occurs in a crushed or frozen limb as a result of venous stasis, and that as long as the arterial supply is carried on it is possible to save the damaged limb, provided the venous system is emptied at regular intervals. In the case of a frozen toe or finger or one that has been crushed, but in which there is still a strip of tissue uniting it to the body, Noeske's plan of treatment was as follows:—

After cleansing the wound and surrounding skin, he made a deep incision down to the bone and parallel to the nail at the extremity of the finger, which was then enclosed in a rubber cap attached to a rubber tube connected with a water pump which produced a negative pressure of 12 to 15 cm. of mercury. He repeated the suction at frequent intervals during the day for ten minutes at a time and the incision was plugged with a camphor dressing to prevent it from healing. By this means he emptied all the veins in the crushed or frozen digit. The vessels of the digit were gradually filled up again through the intact artery. After a few applications the digit usually lost its bluish colour and took on a healthy red tint. The original wound was left open for several days and united by secondary suture when the circulation in the damaged portion had been restored. One of Koehler's cases was a machinist, whose finger had been crushed and almost severed in a cutting machine. Under the above treatment his finger reunited with perfect movement in the course of some six weeks. In the second case a soldier had both feet badly frost bitten, the two great toes were dark blue, without sensation, and no blood flowed when they were pricked. It seemed impossible to save them. The other toes and the rest of the foot were less severely affected. On making the deep incisions in the great toes there was no bleeding. During the first application of the pump some 30 c.c. of blood was drawn through the toes. The treatment was continued for fourteen days and then replaced by massage, hot baths, &c. In, roughly, two months, the toes had completely recovered.

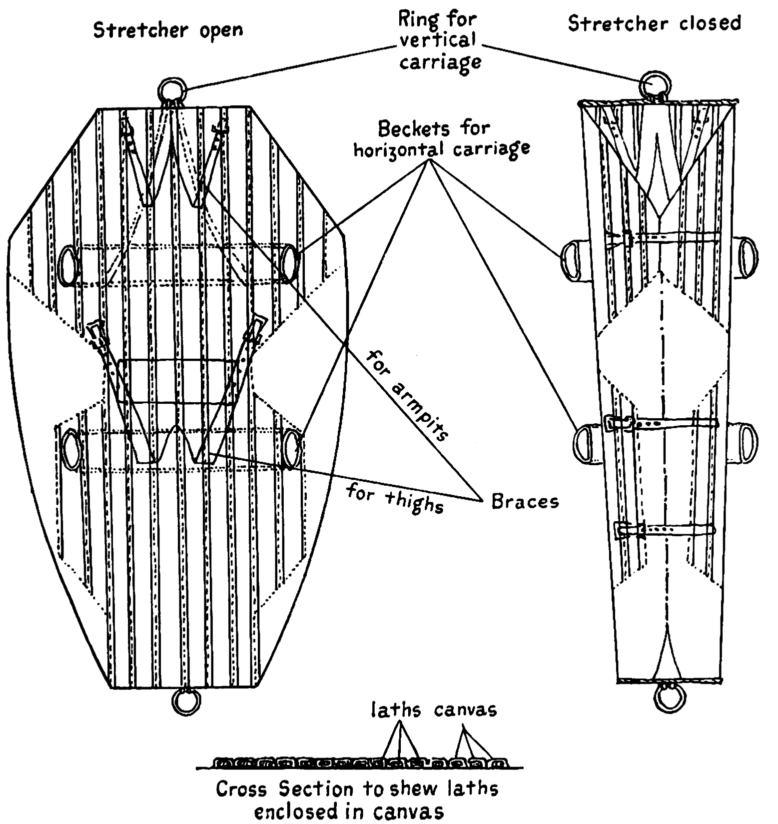
C. E. P.

A Semi-rigid Stretcher for Use on Board Men-of-War.—A note in the *Deut. Militärärzt. Zeit.*, March 20, 1913, describes an apparatus designed by Médecin Major Dr. Bellile, of the French Navy.

The speciality of the stretcher is that it is made of double canvas, stiffened with wooden laths 30 × 6 mm. in section, placed at 5 cc. interval. The dimensions of the stretcher are 5 ft. 9 in. × 23½ in.; its weight is 17½ lb; its price £3. For carrying a patient in the horizontal position four bearers are necessary, using the lateral beckets or handles, or two men if poles are run through the lateral handles.

The accompanying sketches show the apparatus open and closed, and a cross section through the stretcher to show the laths enclosed in the two thicknesses of sail-cloth.

The rings at the head and foot are for supporting the weight of the stretcher while carrying a patient in the vertical position, up or down a shaft. The upper pair of braces would seem to go under the patient's



A semi-rigid stretcher.

armpits, the lower pair under his thighs. When the stretcher is closed it is fastened by three straps and buckles.

H. E. R. J.

The Value of Anthropometric Minima in the Selection of the Soldier.—Tenente Colonello Medico Dr. Ridoleo Lini (*Giornale di Medicina Militare*, April 30, 1911) begins by pointing out the great responsibility of the examining medical officer, whose duty it is to adjudicate between the suitable and unsuitable men called up at the annual levy for service in the Italian Army, and the snares which beset him.

These dangers are minimized, and his responsibility lightened, by the fixing of anthropometric standards. But standards, as he goes on to show, have their disadvantages. The suitability for service of a man depends on several factors, any one of which taken singly as a criterion would lead to fallacy.

The only reliable way of testing a man's physical fitness would be to discover the amount of muscular exertion which he could undergo for a given period without impairment of nutrition. This test would, of course, be impracticable. The criterions on which a choice is based, the man being free from disease or physical infirmity, are:—

(1) His "ensemble," his muscular development, agility of movement, harmony of form, and colour of skin, &c.

(2) His anthropometric characteristics.

The latter, in the military legislation of some countries, constitute a *sine quâ non* for admission to the Service. In other countries a certain latitude in this respect is allowed, measurements being used only as a guide to the examining medical officer.

But the basic factor upon which suitability for military service is determined is stature. This from ancient times has been the primary consideration. Men of 5 ft. 10 in. to 6 ft. were chosen for the élite—the light cavalry and the first cohorts of the Roman Legions in the fourth century. In all modern armies a minimum limit of height is demanded, which is 4 in. to 5 in. lower than the mean stature of the adult male population of the country. In France alone, since 1901, this limit has been abolished. Its abolition, in the author's opinion, is a mistake, because below a certain height the legs are too short for marching long distances, and the muscular power of the individual is inadequate to sustaining the arms, clothing and equipment without undue fatigue. On the other hand, if an inviolable line of demarcation in point of stature be drawn, above which a man is suitable, and below it unsuitable for service, there is always a risk of rejecting good men, and accepting men whose other qualities make them less desirable.

It can be demonstrated by positive proof that a comparatively low stature is not a disqualification from the points of view of soldierly aptitude, tactical fitness, and the health of the army.

In the work, "Antropometria Militare," which was the result of an inquiry held by the War Ministry on the Italian Army, the question of height and its bearing upon military life is considered.

The inquiry was applied to 256,166 men who were serving in the Army at the ordinary age of the levies—20 to 21 years—and the following table, drawn up by groups according to stature, was compiled from it:—

Height	Never sick	Sick and deaths
Below 63 in.	49·6	50·4
63 to 64½ ,,	47·4	52·6
65 to 66½ ,,	44·8	55·2
67 in. and over	44·4	54·6

From this it appears that men of low stature are more resistant to the varied influences of military life than taller men.

Analogous results are obtained from calculations based on the mean height of individuals observed:—

Mean height of those never sick	64·10 in.
,, ,, sick	65·14 ,,
,, ,, who died	65·22 ,,

It may be argued that in the population of Italy there is a great variety of stature, Venetians and Tuscans being tall men, Sardinians and Calabrians very short, and that the superior healthiness of the shorter men is owing to their being Calabrians—racial quality in fact.

But the opposite is the case. Sardinians and Calabrians figure in all military statistics as being less resistant to disease than northern Italians.

And according to "Antropometria Militare," Calabrian soldiers had 316 per 1,000 never sick, Sardinians 326, while on the other hand Piedmontese had 524, and Lombards 534 per 1,000 never sick.

This law is verified, as in separate districts, so throughout the kingdom of Italy, that the smallest soldiers are the most resistant to disease.

It follows that the lowering of the minimum standard of height would not be prejudicial to the Service, particularly in Italy where, though the population is rather low in stature, the army standard is rather high. It must not be taken, however, that this greater resistance depends upon an invariable physiological rule that the smaller the man is the more resistant he is in the life struggle. The greater number of small men, and of those exhibiting physical defects, is to be found among the poor and labouring classes. But by careful discrimination and selection these classes yield men superior to the other classes in the matter of toughness. They are those who have survived the unfavourable influences of poverty and their entourage, and have so acquired a high power of resistance, and when in the army they are more favourably placed, especially in the matter of alimentation, than they were in their former surroundings. The anthropometric datum which in nearly all armies comes next after height in determining fitness for service is *chest measurement.*

It is a very difficult measurement to obtain, and varies in the same individual under different observers, and at different times under a single observer. As a proof of its capriciousness is the fact that since the constitution of the Italian Army in 1861 the regulations fixing it have been changed seven times.

(1) In 1881 a minimum chest measurement for men of all statures was fixed, of 31½ in.

(2) From October, 1881, a minimum of 31½ in. chest measurement for height of 63 in. and under. For all other heights the chest measurement to be half the height.

(3) In 1882 for all heights below 63·78 in. chest measurement was 31½ in.; above this height 1 cm. for each inch was added to the minimum of 31½ in. chest measurement.

(4) In 1888 a minimum of 31½ in. for all heights of 64 in. and under was fixed.

For 64 to 67·7 in. height,	chest measurement	minimum	was	32·2 in.
,, 67·7 ,, 72·4 in.	,,	,,	,,	33 ,,
,, 72·4 in. upwards	,,	,,	,,	33·8 ,,

A variation of 1 cm. was allowed in the chest measurement for all heights above 63·78 in., except that 31½ in. chest measurement was the absolute minimum.

(5) In 1889 No. 1 standard was reverted to.

(6) In 1896 a proportional standard was readjusted with a minimum

of 31½ in. for all heights below 64·96 in., with an addition of 1 cm. chest measurement for every 5 cm. of height up to a chest measurement of 33 in. for any height over 70·8 in.

(7) In 1909 No. 1 was again reverted to and was in force at the time of writing of the paper.

The effect of No. 3 was to exclude too many otherwise fit men from service, and it only stood for one year. The general effect of a rigid standard, although it relieves the examining medical officer of responsibility, is to class a number of men who would become useful soldiers with the infirm and unfit.

Now the soldiers who were the subject of the inquiry on which "Antropometria Militare" is based, and who belonged to the levies of these born in 1859 to 1863, were enrolled under three different sets of regulations as to chest measurement, viz.:—

Those of 1859-60	.. ..	Under No. 1.
,, 1861	.. ..	,, No. 2.
,, 1862-63	.. ..	,, No. 3.

If the more restrictive code (No. 2) really had the effect of receiving better men, the class affected (1861 levy) should show a smaller proportion of sickness and deaths. Here is the record:—

		Number of men observed	Per cent			
			Never sick	Sick	*Invalided*	Died
Class 1859-60	..	102,282	37·4	54·1	6·3	2·1
,, 1861	..	52,465	42·7	50	5·1	2·1
,, 1862-63	..	102,419	51·9	42·5	3·7	1·9

Here is another table showing the same particulars affecting men according to chest measurement:—

		Per cent			
Group of chest measurements		Never sick	Sick	*Invalided*	Died
Below 33·6 in.	..	43·8	47·4	7	1·9
33·6 to 35·1 in.	..	44·4	48·9	4·5	2·2
35·1 in. and over	..	44·4	49·6	3·8	2·2

Naturally the men with the smallest chest measurement give the greatest number of invalids (*riformati*—men who were rejected after a certain period as not coming up to standard), because a good many of these were men who at the first inspection were defective in this respect. But the smallest number of sicknesses and deaths occurred in men of small chest measurement.

It is not affirmed that the degree of resistance to disease, &c., of the soldier varies inversely with his chest measurement, but the smallest chests occur among the shortest men, and hence this last table is simply a derivative of the preceding one (relating to stature).

But the fact that the men with the medium and largest chests give the same proportion of "never sick" and of deaths is very significant and throws doubt upon the efficacy of the restrictive regulation as to this dimension of which the author has spoken.

The setting of strict rules as to measurements no doubt causes the conscientious examining medical officer to cease to exercise his faculties of independent judgment, and therefore such rules stand self-condemned, because they cause the rejection of many men whom the examiner

would accept as suitable for service, though below standard; whereas, if left to his own judgment, he would reject those who were really unfit from these causes. From what has been said already, it would appear that the lamentable loss to the army of suitable men would still further increase if, in addition to standards of height and chest measurement, a third standard, that of weight, were imposed. This measurement is even more variable and unsatisfactory than chest measurement, because it is affected by passing illnesses, and can be manipulated by the conscript who desires to be exempted from service. Again, all weight is not good weight. It may be divided into three categories:—

(*a*) *Fixed weight*, which varies with stature—that of the bones, viscera, skin, and nervous system.

(*b*) *A second portion*, varying also with the height, but dependent in some degree upon the state of health and exercise, that is of the muscular system.

(*c*) *Altered portion*, that of the adipose tissue.

The first portion (*a*) may be called *inevitable*; the second portion (*b*) may be called necessary and *useful*; the third portion (*c*) may be called *useless*.

The second portion (*b*) has the greatest value in judging of health.

Dr. Pignet has invented an "*index of robustness*" drawn from measurements of height, chest measurements, and weight, and expressed in one figure.

$$\text{Index of robustness} = \underset{\substack{\text{Height in}\\ \text{centimetres}}}{S} - (\underset{\substack{\text{Chest mea-}\\ \text{surement in}\\ \text{centimetres}}}{T} + \underset{\substack{\text{Weight in}\\ \text{kilos}}}{P})$$

As in this calculation, height gives an undue advantage, the author considers that the conclusion drawn from its use is of inverse value.

Numerous observations by various authors show that individuals with the lowest indices are those who, judged from their bodily characteristics of their special aptitudes for Service, are the most robust; and it is open to doubt whether men of the greatest weight, or with the greatest thoracic development, are the most robust. If it is intended to assign a limit in judging of soldierly fitness, the Pignet system is not, in his opinion, of practical value. Take, for instance, two men of the same height. One (A) may be fat, with poor muscular development, with a chest actually small, but padded with external adipose tissue. The other (B) a "dry" man, but muscular, and of the same chest measurement as A, not by reason of fat, but depending upon the size of its bony framework and muscular development.

	A	B
Height	1·65 m.	1·65 m.
Weight	81·0 kg.	69·0 kg.
Chest measurement	0·90 m.	0·90 m.

Under Pignet's system A would be preferred to B, because he has an index of −6, while B shows + 6. It should not be the object in choosing men for the army to form a select body of the most robust individuals and those showing exceptional qualities. It is intended simply to eliminate the unsuitable man,

The whole population should combine in the defence of the State, not only a small proportion possessing exceptional powers. Therefore the minimum standard required of the citizens should be rather below than above the mean of the general population. The author considers that the only prescription that should survive outside of medical considerations is that of a *minimum standard of height*, suitable to tactical requirements. No regulation should be made as to weight. Chest measurement should not be below 31½ in., except in certain cases in which special fitness, physical or mental, is found, when the power of accepting such individuals whose chest measurement may be one or two centimetres below that figure should be accorded. H. E. R. J.

Antityphoid Vaccination, French Army.—Circular No. 10, *Direction du service de santé* (*Bull. du Service de Santé Militaire*, No. 640), dated March 5, 1913, directs that all men serving in Morocco, Algiers, or Tunis, or ordered to serve in any of these places, are to be inoculated against typhoid fever. Vaccine will be supplied on requisition from the laboratory Val-de-Grâce.

C. E. P.

Health of the Troops in Western Morocco, November and December, 1911.—The following notes have been extracted from Méd. Inspecteur Gén. Chavasse's report of his inspection of the medical and sanitary arrangements in Western Morocco (*Archiv. de Méd. et de Pharm. Milit.*, May, 1913).

The principal diseases were typhoid fever, dysentery and malaria.

Several cases of typhoid fever developed among the troops shortly after their disembarkation, and there seemed to be no reason to doubt that these men had been infected before their arrival in Morocco. A certain number of cases were the result of contact infection, others were probably due to drinking polluted water when on the march; again, most of the camps were swarming with flies, which probably also accounted for a certain number of cases.

Most of the cases of dysentery were bacillary in origin, in only a few of them amœbæ were detected in the stools; in several instances an abscess of the liver occurred. It was, however, not always possible to use the microscope in making a diagnosis. Anti-dysenteric serum, supplied by the Institut Pasteur of Paris, was largely employed, with excellent results.

C. E. P.

Austrian Red Cross Society, Volunteer Medical Units.—*Das Rote Kreuz* (Vienna, April 28, 1913) published the report drawn up by the Committee appointed to consider the organization of the proposed new unit. The following are the more important points:—

(1) *Duties.*—Primarily to reinforce with personnel and material the immobilized field hospitals of the army; also if required to do so, to assist in working hospitals on the lines of communication, or to take charge of patients during transit in ambulance trains.

(2) Arrangements must be made to have the unit completed by the twentieth day of mobilization, i.e., at any time after this day it must be

ready to move off on receiving forty-eight hours' notice. In this way all members can continue their civil occupation till immediately before their services are required.

(3) Each unit will have two doctors who are not under any obligation to serve in the army or in existing units of the Society. One of the doctors will be appointed senior medical officer of the unit. If no doctors can be obtained locally, the annual return should state this, and note that they are to be supplied on mobilization by the Central Committee of the Society.

(4) *Nurses.*—Each unit should have thirty nurses; of these from six to ten should be fully trained; the balance may be made up of ladies trained as auxiliary sisters. Any nurse's uniform may for the present be worn, but all must wear the Red Cross brassard.

(5) *Cooks.*—Each unit will have two female cooks.

(6) *Male Attendants.*—Each unit should have four to six male sick attendants to do the heavier work in the wards. For this purpose, students under 20 years of age and, therefore, not due for military service should be available, as large numbers of them always volunteer.

(7) Lists of equipment are being prepared and will shortly be published. As the unit is intended to be merely a reinforcing one, the equipment will be on a very modest scale.

(8) *Financial.*—The cost of organizing and equipping the unit will be borne by the branch which raises the unit. When the unit is called up for duty the central committee of the Red Cross Society will be responsible for all salaries. Professional nurses should be allowed £4 4s. for their outfit, voluntary aid ladies will find their own. When the unit leaves its place of mobilization, rations and conveyance will be provided out of army funds.

(9) *Discipline.*—All members of the unit will be under the command of the senior medical officer. A sister will be appointed in charge of the nurses. If the unit is attached to a medical unit of the army it will come under the commander of the army medical unit. In the area of operations all persons will be subject to military law.

(10) A mobilization plan will be prepared in the same way as for other Red Cross units.

C. E. P.

Correspondence.

TEMPERATURE REACHED IN ARMY BISCUITS DURING BAKING.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have just read the report on "Temperature reached in Army Biscuits during Baking" in this month's Journal. The subject is specially interesting to me, as, while sanitary officer in South Africa three years ago, I had occasion to examine large numbers of tins of biscuits which had become unfit for use owing to the ravages of moths. I then found it very difficult to extract much information on the subject from the public health literature available.

I should like to draw attention to a statement in Lemoine's "Traité d'Hygiène Militaire" (Paris, 1911), which appears to be of importance with regard to the prevention of infection of biscuits by moths. On page 133, he quotes Decaux (Decaux, "Les Parasites du Biscuit de Troupes: Moyens de Préservation," *Arch. de Méd. Milit.*, 1872, *Revue d'Hygiène*, 1893, p. 156), and states, "Decaux has studied three varieties: *Ephestia elutella*, *Ephestia interpunctata*, *Asopia farinalis*, and has shown that these insects only frequent the cases of biscuits from the end of May to the beginning of September: hence the indication to pack the biscuits only in the intervening period of the year." If this statement were confirmed, it would apparently be a simple matter to avoid the infection of biscuits by these insects.

Aldershot,
June 14, 1913.

I am, &c.,
J. G. McNAUGHT,
Major, R.A.M.C.

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Original Communications.

FURTHER RESEARCHES ON THE EXTRUSION OF GRANULES BY TRYPANOSOMES AND ON THEIR FURTHER DEVELOPMENT.[1]

BY W. B. FRY, Major R.A.M.C., AND H. S. RANKEN, M.B.Glas., M.R.C.P.Lond., Captain R.A.M.C. (With a Note on Methods by H. G. PLIMMER, F.R.S.)

[PLATES 9—11.]

INTRODUCTION.

IN March, 1911, in the course of some work on trypanosomes carried out at the Wellcome Tropical Research Laboratories, Khartoum, the extrusion of certain granules from trypanosomes was observed by one of us (W. B. F.). The Director of the Laboratories, Dr. Andrew Balfour, was informed of these observations, and he himself shortly after observed a somewhat similar extrusion of granules from spirochætes (spirochætosis of fowls), an account of which he published.[2]

In June, 1911, a preliminary note on the subject was communicated to the Royal Society by one of us (W. B. F.). Since then, a great deal of work has been done on the subject by us conjointly, but for the most part independently; by one of us (W. B. F.) at Khartoum and in London, by the other (H. S. R.) at Yei in the Lado Enclave.

[1] Reprinted from the *Proceedings of the Royal Society*, B., vol. lxxxvi.
[2] *British Medical Journal*, April 1, 1911.

As will be seen, the results recorded in the course of this paper go far to confirm the conclusions arrived at in the preliminary note, i.e., that the phenomenon is one connected with a stage in the life-history of the parasite, especially in chronic trypanosomiasis, in which it is found that the trypanosomes disappear from the blood of an affected animal for considerable periods.

These observations offer, too, an explanation of the infectivity of fluids, blood for example, which, while showing absolutely no trace of trypanosomes, will infect susceptible animals, a fact that all workers on trypanosomiasis are acquainted with; they also throw light on that condition which has been spoken of as "a possible ultra-microscopic stage" in these diseases.

Methods.

In the earlier part of these investigations two methods were principally used, they were :—

(1) Dark-ground illumination used in the ordinary way, but with the addition of a practically monochromatic light, which improved the definition.

(2) A method of "vital staining," the stain used being 0·75 per cent toluidin blue in physiological salt solution. This was mixed with blood, gland juice or other fluid to be examined, in a capillary pipette, blown on to a slide, covered with a cover-slip, and ringed with vaseline. With solid organs an emulsion in salt solution was used. The proportion of stain varied with the material from 1—3 to 1—8, according to the rate at which it was felt desirable to cause the staining to take place.

New methods of fixation and staining have also been used; these form the subject of a note appended to this paper. Both of these processes give practically the same results.

I.—On Granules in General in Trypanosomes.

Besides the nucleus and blepharoplast there are other bodies in many trypanosomes which may, in the ordinary acceptation of the term, be called "granules."

There are certainly two classes of granules to be seen in trypanosomes: (1) those with which we are concerned—probably of nuclear origin and of infective nature; and (2) others which probably represent stored food material. The latter are of importance for us only because of the possibility of their being confused with the former, and here it may be stated that it has been found possible to fix and stain preparations so as to show a difference between

them in staining reaction. Further evidence in favour of this differentiation was met with as a side issue in the course of experiments with hypertonic and hypotonic salt solutions, to be described later. It was found that when trypanosomes swelled up under the influence of these solutions many granules disappeared, leaving evident only from one to three. The inference seems to be that the granules which disappeared, owing to alteration in osmotic conditions, are of a quite different nature.

In this paper the word "granule" connotes those first mentioned, whilst the food granules are ignored in our descriptions, unless specifically mentioned.

The following varieties of trypanosomes have been available for study, and granules have been observed in all :—

(1) *T. gambiense* (Sudan), (2) *T. rhodesiense,* (3) *T. brucei,* (4) *T. evansi* (Sudan), (5) *T. nanum* (Sudan), (6) *T. pecaudi* (Sudan), (7) *T. lewisi.*

In all cases the granule, as seen by dark-ground illumination, is a small, sharply defined, highly refractile body, and on vital staining it takes up the toluidin blue rapidly, and shows as a deeply stained, more or less circular body, which contrasts with the lighter tint of the trypanosome body.

The number of granules apparently varies in different species of trypanosomes. They may also vary in size and number in the same species, e.g., a strain of *T. nanum,* obtained from cattle, was carried on by passage through gerbils. For two and a half months many of the trypanosomes contained a single large granule. At the end of this period the granule became multiple, and three or four could be seen; at the same time there was a great diminution in their size. It was noted that, coincidently with this increase in number of granules, the virulence of the strain became greater. We have found that granules are not necessarily always present in trypanosomes. At present we can only generally indicate the stage at which granules may develop, and are unable to say what conditions determine their appearance; but the following details are the result of our observations :—

T. brucei was investigated in gerbils, in which the disease was fatal in six weeks, and during its course they showed at least two or three exacerbations with a large number of trypanosomes in the blood, with corresponding latent periods when they were absent.

When trypanosomes first appeared in the blood, whether at the beginning of the infection or after a latent period, it was observed that they did not contain granules; the latter developed about the

fourth day after trypanosomes were first seen, and increased in size and number. For about twenty-four hours trypanosomes with granules were numerous. After this period when free granules were numerous in the blood, the proportion of trypanosomes containing granules steadily diminished, till finally, though an enormous number of trypanosomes might be present, granules could not be found in any of them. This condition usually preceded a latent phase, or the death of the animal.

We have thus a definite sequence of events during an exacerbation of the disease :—

(1) Trypanosomes without granules.

(2) Trypanosomes showing granules which gradually become larger and very evident.

(3) Many free granules.

(4) Many trypanosomes, but no contained granules.

(5) Trypanolytic crisis, or death of the animal.

This was also found to hold good with *T. nanum* and *T. evansi* (Sudan).

In the case of a goat inoculated with *T. brucei*, which lived for 133 days, and whose blood from the end of the first fortnight was always infective, no trypanosomes were at any time discoverable in the blood, which was examined daily for the first two months of the illness. In all the specimens of blood examined granules have been found. Similarly in the case of guinea-pigs and rabbits the blood has been found to be uniformly infective during the so-called latent periods, when no trypanosomes can be found in the blood by microscopic examination.

II.—Extrusion of Granule.

The original observations have been repeatedly verified during the past eighteen months, and we have been able to satisfy ourselves completely that extrusion of granules is a constant feature of trypanosomal infections.

The phenomenon has been observed in all species of trypanosomes studied with the exception of *T. lewisi*. We were able to assure ourselves of the presence of granules in that trypanosome, but the movements are so active that definite extrusion was never witnessed by either of us. On account of the high degree of motility the species was unsuitable for work on this subject, and prolonged observations were not made. The mechanism of extrusion has been studied in detail in *T. nanum* and *T. gambiense*.

(1) *T. nanum.*—The strain was obtained from infected cattle from the White Nile district, and, for the purpose of these observations, was kept up by passage through gerbils. This type of trypanosome is very convenient for the study of this process, as the granule is large and very evident and the trypanosome, whilst evincing active lashing movements, does not progress across the field of the microscope, but remains more or less stationary, so that there is no difficulty in watching the same trypanosome through all the phases over a period of several hours, if necessary. Further, an animal can be selected at a period when extrusion is a frequent occurrence.

When extrusion is about to take place the granule begins to work its way slowly, but quite distinctly, from the centre of the trypanosome towards the pointed extremity. Arrived there, it makes its way back to the centre. This takes place quite often—as many as seven or eight such movements having been observed. During these passages the granule can be seen distinctly bulging the periplast as if becoming more and more superficial—this bulging being strikingly apparent at the pointed extremity. Probably this movement is largely due to the movements of the trypanosome itself. Finally, the granule, stretching the periplast to a greater extent, is extruded suddenly from the pointed extremity and becomes a free element in the surrounding medium. Plate 9, fig. 1, illustrates all these stages.

(2) *T. gambiense.*—Here the preparations were made direct from cases of human trypanosomiasis.

In this species the granules are multiple and move rapidly backwards and forwards in the long axis of the trypanosome. They exhibit also a dancing movement and appear to throw themselves against the periplast and rebound from it. Sometimes the granules approach the surface, and in so doing may actually cause a slight protrusion on the covering membrane. This seems to be preliminary to extrusion, as afterwards the granule may be shot out with a certain degree of force into the free fluid to some distance from the host. In this species extrusion is not as a rule effected from the extremity, but from some point near the middle of the trypanosome body.

In infections running a very rapid course—such as *T. brucei* and *T. rhodesiense* in white rats—extrusion is readily observed, whereas in sleeping sickness in man, a very chronic infection, prolonged search may be necessary. Certain intermediate types of the disease are particularly suitable for study of this subject—

for instance, *T. brucei* in gerbils as described above. In the course of this infection granules are not extruded when the trypanosomes first appear. At a later stage the phenomenon is easily seen, and again it cannot be observed just before disappearance of trypanosomes from the blood. These facts tend to confirm our opinion that extrusion occurs at a definite period in the life of an adult trypanosome.

Extrusion can be stimulated by the administration of drugs and by certain mechanical effects such as variations in osmotic conditions. Reference is made to extrusion induced by varying strengths of salt solution in a later section of this paper.

Under ordinary circumstances extrusion of granules does not appear to have a prejudicial effect on the trypanosome. In warm wet preparations it can be seen to continue its movements and it apparently lives as long as the others. On the other hand, it has been shown above that extrusion of granules, if occurring generally, apparently heralds a disappearance of trypanosomes from the blood and is, in fact, the precursor, of a trypanolytic crisis. Under favourable circumstances—e.g., after treatment, extrusion is followed by rapid disintegration of the trypanosomes.

III.—Effect of Drug Treatment on Extrusion.

Certain phenomena in connexion with the liberation of granules have been observed after treatment with antimony. Cases of sleeping sickness were given an intravenous injection of metallic antimony, and gland-puncture wet preparations made at short intervals after treatment, three minutes, five minutes, and so on. These were examined by dark-ground illumination and the results of the observations are here described.

Extrusion of granules is more frequent. The exaggerated motility is one factor, and the protoplasm, and more particularly the periplast, seem to lose elasticity, with the result that the granules can get free more easily. If a granule is forcibly ejected by energetic movements of the trypanosome it is flung out into the free fluid to some distance; this is the most usual method.

Some trypanosomes seem to be acutely poisoned by the antimony, and death and complete dissolution occur very rapidly. This is more frequently seen when the preparation is made five to seven minutes after injection of antimony. The trypanosome becomes anchored, its lashing movement slows down and comes to a standstill, the body swells and becomes bloated, losing its

characteristic form. In this condition it is devoid of energy and can no longer forcibly extrude granules, but the latter have not suffered so severely and may still show an excited dancing movement inside the degenerate trypanosome body, which appears to give way before this activity, and the granule may ultimately work its way clear of the degenerate protoplasm and inelastic covering of the now dead or dying trypanosome.

In other instances the trypanosome does not die so rapidly, and the granules, after continuing this dancing movement inside it for some time, gradually come to rest before the trypanosome has reached so advanced a state of degeneration as to permit a dancing granule to escape by its own efforts. The degeneration of the trypanosome continues till it has lost outline and refractility and can only be recognized as an ill-defined "ghost," enveloping the granules which are held in position—more or less in the original long axis of the trypanosome—by this viscid protoplasm. This is the last stage that can be seen in a dark-ground preparation where the objects are at rest. In the living subject, however, it is probable that this degenerate protoplasm would not be allowed to remain at rest, but would be broken up by the active currents and eddies and the granules would thus be set free.

Thus there are probably three methods by which a granule may be liberated from the parent trypanosome:—

(1) By the activity of the trypanosome—forcible extrusion.

(2) By the active movement of the granule in a rapidly degenerating trypanosome.

(3) By outside agencies, eddies, currents, &c., which may break up a degenerate trypanosome when the contained granules are unable to effect their escape.

In some cases extrusion occurs rapidly. A trypanosome has been seen to extrude two large granules and immediately afterwards break up—the whole process being complete in twenty minutes.

In the early preparations (three minutes) the exaggerated motility is a prominent feature and forcible extrusion is most commonly seen; in the later films (seven minutes) the antimony has had longer time to act and the phase of hyperactivity has passed. It is then more usual to see the more gradual escape of the granule, and as the trypanosomes are "anchored" they can be kept under observation more easily. On several occasions where death has occurred slowly we have been able to watch a trypanosome for periods up to four hours. In the twenty-minute preparations trypanosomes have never been found, but granules are very

numerous. The activity of the freshly extruded granules after antimony is much greater than the movements of granules seen before treatment.

IV.—The Free Granule.

The granule free in the blood or fluids is seen to be a small spherical or pear-shaped body. In dark-ground preparations it is seen to be highly refractile, and by its activity it causes considerable disturbance in the surrounding fluid; with vital staining this young granule takes on the stain rapidly and uniformly, and seems to be undifferentiated. It frequently remains near its former host for some little time before showing independent movement. At first only a dancing movement may be seen; this, however, is a preliminary phase, and soon the granule begins to move slowly across the field, turning over on itself. There is no doubt as to the motility: they have often been observed to move out of a microscope field in preparations where there was no question of currents, &c. In our opinion a pseudopodial protrusion appears early, which at first is short and rather thick.

In animal infections and in cases of sleeping sickness in man, granules are found in the blood, glands, and internal organs. They are, of course, much more numerous in animals in which the adult parasites appear in great numbers. In experimental animals granules have been found in the proximal glands twenty-four hours after inoculation. This fact seems to be of great importance.

The criterion in the recognition of granules must be motility,[1] but their greater affinity for such stains as toluidin blue is of undoubted assistance in distinguishing them from the countless small bodies seen in wet preparations, e.g., blood-platelets and leucocyte granules.

V.—Further Development of Granule.

So far we have shown that the trypanosome discharges living elements endowed with motility, and showing the same reaction as nuclear material to toluidin blue. The further stages are more difficult to follow, as all stages cannot be seen in any individual preparation. We have endeavoured, so far as possible, to correlate

[1] The addition of a small quantity of cherry-gum solution to the preparation will differentiate between Brownian and vital movement. It stops the former and slows the latter.—H. G. Plimmer.

the various appearances met with; at the same time we cannot be sure that we set them out in exact chronological order.

In the first place granules, like many other free bodies in the blood plasma, are liable to undergo phagocytosis, and have been seen in all conditions within polynuclear leucocytes.

Granules somewhat older have also been seen in hyaline mononuclear and in endothelial cells, but in cells of this type, on the other hand, the contained granules are quite unchanged, and we are unable to say that they are being destroyed. It is possible that they may be entering on an intracellular phase of existence. They have been very well seen by one of us (W. B. F.) in a large mononuclear leucocyte during examination of the blood of a cat infected with *T. nanum*. They have also been seen in endothelial cells in liver puncture preparations from cases of sleeping sickness.

The first change seen in the free granule is a slight enlargement and elongation, rendering it more definitely pear-shaped. Then one begins to note a slight differentiation of structure into a central area staining a dark blue or purple, and a peripheral zone which is only faintly tinted blue. The enlargement is progressive, and the body becomes more uniformly blue, while a small dark blue or purple spot is visible, varying in position from the centre of the body to the apex. This may be assumed to be the earliest differentiation of cytoplasm from nuclear material. At this stage there is sometimes a definite flagellum-like projection which is usually short and rather thick, and more like a pseudopodium (Plate 11, fig. 2).

The same early forms have been studied in dark-ground preparations from bone-marrow in animals infected with *T. nanum* and are illustrated in Plate 9, fig. 2, A to I.

From this point the body enlarges, and the flagellum-like body becomes relatively, if not actually, reduced in size, so that forms are seen as in Plate 11, figs. 3 and 4. Later on the mass of chromatic material divides, and two are seen—one much smaller than the other. The body then becomes more rounded. Some are regularly spherical, while others show projections from various points, and have on surface view a roughly triangular appearance.

At this time of their development they resemble very closely the Leishman-Donovan bodies in kala-azar; they are found some times in enormous numbers in lungs, bone-marrow and spleen. Death in acute trypanosomiasis is caused by plugging of the cerebral capillaries with these forms. This cause of death is very similar to that in pernicious malaria.

From this stage—the binucleate body—there appear to be two directions in which the further development may proceed. The body may enlarge slightly, develop a true flagellum from the neighbourhood of the micro-nucleus, and then become longer. This increase in length continues, and the macro- and micro-nucleus in this process become further separated; the flagellum comes to lie along the margin, and this form can now be recognized as an early immature trypanosome. There is no undulating membrane, but development proceeds till the adult form is reached.

On the other hand, the circular form may enlarge to a greater degree, and show a larger amount of a pale-blue staining cytoplasm that seems characteristic of young forms. The nucleus and micro-nucleus then undergo division by schizogony, but remain within the single mass of cytoplasm. The time of appearance of the flagellum seems to be variable, but ultimately all the pairs of macro- or micronuclei come to have a flagellum with a fan-shaped origin usually projecting beyond the margin of the cytoplasm.

Plate 11 shows forms with two, four, and eight macro- and micronuclei and flagella. We have seen indications of similar forms in vital preparations, but the latter cannot show the same detail as fixed and stained preparations. We have no knowledge as to the conditions which determine either of these events—possibly in the latter case there may be some sexual process either in the cells or fluids.

Many of these bodies are identical with the Plimmer and Bradford bodies, which they described in 1902,[1] and we have found them in preparations made from many different animals and from man, of glands, internal organs and bone-marrow. They show when living undoubted motility, but the early granule shows much more active movements than these later forms. The fact of their showing this vital property, however, precludes any possibility of their being degeneration forms.

In a few cases of sleeping sickness in man some other bodies have been seen by the vital method in fluid obtained by liver puncture. In the majority of instances some blood was mixed with the liver juice; this diluted the fluid and the bodies were very scanty, but the appearances presented suggested that some process of division was going on. Protoplasmic masses were seen containing four or eight small ovoid bodies taking on nuclear stain, but there was no nuclear differentiation. These were seen only in wet preparations, and could not be preserved.

[1] *Quarterly Journal of Microscopical Science*, February, 1902.

Another form was seen as a fusiform body lying round a segment of the periphery, apparently of a mononuclear cell. It suggested an immature trypanosome, and this idea was confirmed by the presence of similar bodies free in the liver juice showing slight sluggish movement.

VI.—Fixed and Stained Specimens.

The foregoing sections have dealt with living trypanosomes, but we were not able by the ordinary methods to make permanent preparations showing the various stages and forms, and demonstrating the staining reactions of the granule from its origin as a nuclear bud onwards.

Mr. H. G. Plimmer, F.R.S., has appended a note describing special fixing and staining methods devised by him, and we wish to state that it is only by the use of these methods that we have been able to confirm the appearances we have described in unfixed wet preparations, together with the differentiation between vital and nutritive granules.

In regard to the granule within the trypanosome, films have been stained showing the granule taking origin from the macronucleus itself as a small bud with characteristic chromatin reaction. All the stages of separation have been seen till the granule is a small, independent, dense, chromatin-staining mass in the cytoplasm (Plate 10, figs. 1-6). The granules, as stated, vary in number, and are most frequently seen between the macro- and micronucleus. They stain a deep red and show a remarkable contrast to the food granules which have taken on the iodine reaction from the fixation, and are visible as bluish-staining bodies or sometimes as a fused mass. This can be better seen in certain bird trypanosomes on account of their large size.

In a certain number—probably the larger number—of instances the granule at some stage of its development is surrounded by a faint-staining hyaline circular or ovoid area. It is probable that in such cases the granule is really within a vacuole (Plate 10, fig. 8). Sometimes the granule appears to be spherical, but in other cases, even when being budded off from the nucleus, it already shows as an elongated, pear-shaped body; this is well seen in Plate 10, figs. 2-4.

Granules can be seen actually causing a protuberance on the periplast and evidently on the point of being extruded. Others have been fixed when half-way out, while free granules, which have

just effected their escape, have been seen lying close to the parent trypanosome. The early free granule takes on the chromatin stain deeply, and is identical with the body observed by the vital method.

The observations as to phagocytosis have been confirmed and more advanced forms, showing a macronucleus, micronucleus, and flagellum, have also been seen within polynuclear cells, and rounded forms resembling the Leishman-Donovan body have been demonstrated in large mononuclear cells.

All stages have been seen from the early free granule; the protoplasm becomes more visible and increases in amount; the nuclear material becomes differentiated from it and more concentrated, and then we are able to see early forms with a macronucleus and micronucleus. The macronucleus in the circular forms may be spherical or may become elongated and spread out along the periphery. Some forms show much more protoplasm; it stains a pale blue and sometimes shows some faint pink granules. The flagellum varies in length, but is relatively much longer than that of the adult trypanosome. In the internal organs, and especially in the lung, there may be enormous numbers of these small rounded bodies with macro- and micronuclei, with or without flagella, sometimes separate and sometimes massed together.

A further stage has been observed in these masses; they have been seen just on the point of disruption, some of the small bodies were separating, and lay at varying distances from the main mass. Each showed the two nuclear elements with a small body of homogeneous cytoplasm.

In addition, forms such as mentioned on p. 146 have been seen—large masses of protoplasm with two, four, or eight macronuclei, and corresponding micronuclei, which are, as a rule, placed close to the macronuclei, and stain very densely. The flagellum can be seen arising from a line equal in length and close to the micronucleus, in a fan-shaped collection of very fine filaments which unite to form a flagellum (Plate 11).

In smears of blood or organs advanced single forms—i.e., with one macronucleus, micronucleus and flagellum, and a relatively large amount of protoplasm—can be seen, and all stages from this to the adult trypanosome (Plate 11). A series has been prepared showing an almost imperceptible gradation from the granule stage up to adult trypanosomes.

Up to this point we have only referred to the work of Bradford and Plimmer in their paper on *T. brucei* and its development. In

this paper and in the plates they have described and figured the granules within the trypanosomes, the free early bodies, the more advanced single forms called "amœboid" and the disrupted schizogonous bodies called "plasmodial masses."

Our work was carried out at a time when we had no access to the paper, and this makes it all the more remarkable that the forms we describe should so closely resemble, and indeed confirm, many of the appearances described in 1902, and we feel that in many respects we can add little to the original work, beyond demonstrating the vital properties of these bodies.

We should like to draw attention to the fact that early granules, forms with short flagella and small round forms, are figured by Mott[1] in his "Histological Observations on Sleeping Sickness and other Trypanosome Infections."

VII.—Some Animal Experimental Work in Reference to Granules.

A number of experiments were undertaken to ascertain if it were possible to infect animals by granules alone. To do this, fluid containing granules and no trypanosomes was required. It was thought possible that the granules (if reproductive elements) might prove more resistant to changes in their environment than adult trypanosomes. In order to test this, blood showing a heavy infection was added to a hypertonic salt solution, up to 2 per cent.

It was found on mixing one volume of infected blood with two to three of salt solution and keeping it at temperatures between 34° and 38° C., that after standing for five to ten minutes individual trypanosomes began to swell up and become globular and the contained granule or granules to become active, moving about in the now spherical trypanosomes; after a short period the granules escaped from the containing membrane and became free. The remnant of the trypanosome was left as a faintly discernible spherical body with no characteristic features.

This process of escape of granules continued until no formed trypanosomes could be found; at the end of from half to three-quarters of an hour the process, as a rule, appeared complete. There are apparently several factors which influence the occurrence of this phenomenon, the temperature, the hypertonicity of the

[1] "Reports of the Sleeping Sickness Commission of the Royal Society," No. VII, December, 1906.

solution, the stage of development of the trypanosomes, and the strain worked with.

If, whilst looking at one of these slides during the process, an individual trypanosome be watched, it will be noticed that its active movements suddenly become slowed, and then, as though blown steadily out by some entering fluid, the trypanosome, in the course of about three to ten seconds, is changed from its usual shape to that of a round body in which the granule or granules are freely motile. The escape of the granule takes place, as a rule, a few minutes after this.

Infection was obtained repeatedly, and the following are details of two positive results:—

No. I.

November 5.—Gerbil (F. 10) injected with about 0·2 c.c. of treated blood obtained from a gerbil infected with *T. nanum* (heavy infection). The injected blood was treated with sodium chloride solution 2 per cent. and sodium citrate 1 per cent. for one hour. At the moment of injection no living trypanosomes could be distinguished; sphere forms and free granules very numerous.

November 10.—Trypanosomes first found in blood.

November 11.—Trypanosomes very numerous.

November 14.—Gerbil found dead; spleen very large.

No. II.

November 5.—Gerbil (F. 11) injected with blood (0·2 c.c.) obtained as above, but after two hours' standing no trypanosome could be seen, only round forms and free granules.

November 12.—Trypanosomes first found in blood.

November 14.—Trypanosomes very numerous.

November 15.—Gerbil found dead; spleen very large.

The average time of infection in gerbils is four to six days after ordinary inoculation. Similar results were also obtained with dogs.

These experiments are, of course, not absolutely conclusive, but so far as could be ascertained microscopically the granules were the only discernible remnants of the trypanosomes which retained their characteristic form.

Further experiments were also made to trace if possible the fate of granules so injected into animals. Inoculations were made with solutions containing a large number of free granules, and the

animals were killed before trypanosomes could be found in the blood. Granules and the later forms in various stages of development were found in the proximal glands, also in the internal organs.

NOTE ON A NEW METHOD OF BLOOD FIXATION, BY H. G. PLIMMER, F.R.S.

During some years of work on the blood of animals, many methods of fixation have been tried, principally with the view of obtaining a better fixation of blood parasites. The method described below has fulfilled this object better than any other, and is more faithful than even osmic acid.

The use of iodine for the fixation of unicellular organisms dates from the work of Kent in 1881 on the Infusoria, but the application of it to blood is, so far as I know, new.

I have used iodine in two forms, in vapour and in solution, and each has its special advantages. When a blood-film is exposed wet to the vapour from a solution of iodine in chloroform, the fixation of the various elements is practically instantaneous, as the penetrative power of iodine in this form is greater than that of any other fixative known to me; there is less alteration both in form and size of the cellular elements and parasites than with any other fixative. When used in solution several things happen which are of value in enabling very fine structures to be more easily made out.

If blood be mixed with a solution of iodine in salt solution containing iodide of potassium, certain elements and parasites, especially trypanosomes, swell up so that the finer parts of their structure, for instance the nucleus and blepharoplast, are much clearer and more definite than with the ordinary methods. The nucleus shows as clearly as, if not clearer than, when Flemming's solution and iron-hæmatoxylin have been used. There is the clear space containing the karyosome, and surrounding this, in many cases, are seen a number of granules, some of which can be seen budding off. The blepharoplast is clearly seen as a structure quite distinct from the micronucleus, and the earlier stages of division of a trypanosome, i.e., the division of the blepharoplast and the formation of a second undulating membrane extending down the body of the trypanosome and forming eventually a second flagellum, can be seen and followed easier than with any other mode of fixation. For the smaller forms found in spleen, glands,

and marrow of animals with chronic trypanosomiasis, this method, by causing swelling of the elements, renders the very small forms distinct, and renders their nuclear structures much more visible.

Both these methods are also the best I have found for avian and reptilian blood containing parasites, e.g., filaria, malaria, hæmogregarines, &c.

The steps of the two methods are here detailed. Either slides or cover-glasses can be used, but in all blood-work the best results are obtained with cover-glasses. After the Giemsa or fuchsin staining the definition is greatly increased by the use of a green monochromatic screen, such as Wratten's No. 19, which shows the picture in blacks and greys.

I.—Vapour Method.

(1) Expose the thinnest possible film whilst wet to the vapour of a solution of iodine in chloroform for ten to fifteen seconds until it is distinctly yellowish.

A hollowed glass block does for cover-glasses, and a glass cylinder of suitable height, with the iodine and chloroform in a small vessel at the bottom, does for the slides. In cold places the vessel should be warmed in order to get the vapour given off freely.

(2) Place the film when it has become just surface dry (a dead, mat surface, not really dry) in chloroform, or in alcohol and ether, equal parts, for two hours. I use chloroform for cover-glasses and alcohol-ether for the rougher slides.

(3) There will now be no free iodine left in the film, and it can be stained in many ways. I use the following:—

A. (*a*) Drop 3 to 8 drops of Giemsa's solution on the film, and immediately after double the number of drops of distilled water. Leave for from two to twelve hours.
   (*b*) Wash well with tap-water.
   (*c*) Drop on 2 to 8 drops of orange-tannin solution and leave for fifteen seconds.
   (*d*) Wash thoroughly with tap-water, up to two minutes.
   (*e*) Dry with filter-paper.
   (*f*) Mount in cedar oil or liquid paraffin.

B. (*a*) Carbol-fuchsin for from two to twelve hours.
   (*b*) Wash in tap-water.
   (*c*) Alcohol until free from bulk of stain.
   (*d*) Differentiate in clove oil saturated with orange G.

Fig. 1.

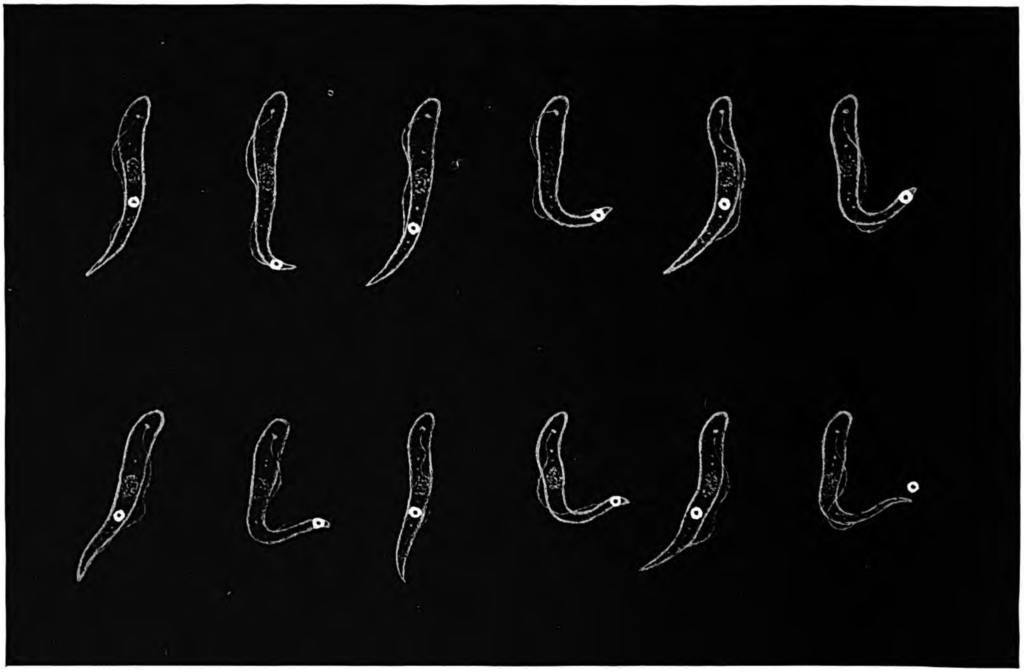


Fig. 2.

A B C D E F G H I

To illustrate "Further Researches on the Extrusion of Granules by Trypanosomes and on their Further Development."

By Major W. B. Fry, R.A.M.C.; Captain H. S. Ranken, M.B.Glas., M.R.C.P.Lond., R.A.M.C.; and H. G. Plimmer, F.R.S.

(*e*) Stop when desired by washing in xylol.
(*f*) Mount in cedar oil or liquid paraffin.

C. Iron-hæmatoxylin may be used in any of the ordinary ways. Kernschwarz for twenty-four hours gives very delicate results.

II.—Solution Method.

(1) Make a saturated solution of potassium iodide in 0·8 per cent salt solution and add iodine to saturation.

(2) Mix 5 to 6 drops of this with 10 c.c. of salt solution.

(3) Mix in a marked pipette equal parts of this and the blood to be examined. In the case of organs small pieces may be crushed in an equivalent quantity of the iodine solution to form an emulsion.

(4) Take large drops and make a thickish film. Wait until the surface has begun to dry (as in I), and place in alcohol and ether for two hours.

(5) Continue as under 3.

DESCRIPTION OF PLATES.

Plate 9.

Fig. 1.—Series to illustrate mechanism of extrusion of granules in *T. nanum.*

Fig. 2.—Developmental forms of *T. nanum*, seen in bone-marrow; the progressive tendency towards the characteristic shape of the adult trypanosome is shown. Dark-ground illumination, Leitz $\frac{1}{12}$ objective, N.A. 1.30, compensating eyepiece. × 8.

The earliest form, A, shows no evidence of a protoplasmic envelope, and has the appearance of a well-developed granule just after extrusion. In B the cytoplasm is clearly evident and the separation of the micronucleus has commenced. C shows a well-developed form, of circular shape, with the nuclei shown at a distance from each other.

D, E, F, and G show the progressive increase of protoplasm, the last form being almost trypanosomal. H is a young trypanosome, and I an older one, in which a flagellum is evident.

These forms were all living when drawn.

Plates 10 and 11.

All the figures are drawn under a Zeiss 3 mm. apochromatic objective, N.A. 1.40, with compensating ocular. × 12.

Plate 10.

Figs. 1 to 8.—*T. rhodesiense* in rat's blood, showing granules from their origin to extrusion.

Figs. 9 to 16.—From blood and liver of rat infected with *T. rhodesiense.*

Figs. 17 to 22, 24, and 26 are from the spleen of a guinea-pig infected with nagana which lived three months, and showed no trypanosomes in the blood for some time before death.

Figs. 23 and 25.—From a lymphatic gland of a cat infected with nagana.

Fig. 1.—Four granules are seen in the trypanosome-body, and another is in an early stage of being budded off from the macronucleus at the right upper angle.

Fig. 2.—Two granules are seen coming off the macronucleus. The one on the left is still attached and shows the elongated form.

Fig. 3.—A similar elongated granule is seen completely separated from the nucleus. There is a faint indication of a halo surrounding it.

Fig. 4.—A large elongated granule is seen between the macro- and micro-nuclei, lying close to the periblast.

Fig. 5.—Several granules are present; one is just being detached from the macronucleus.

Fig. 6.—Two granules are seen on the point of escaping from the trypanosome; the larger looks as if it is nearly extruded.

Fig. 7.—A recently extruded granule is seen near the trypanosome. The macronucleus shows two deeply-stained points—probably granules becoming differentiated in its substance before being budded off.

Fig. 8.—Two granules, lying between the macro- and micro-nuclei, are each seen to be surrounded by a well-defined clear hyaline area. Two others are almost completely separated from the macronucleus.

Fig. 9.—Free granule; no differentiation.

Fig. 10.—Free granule, larger, and with a faint rim of cytoplasm.

Fig. 11.—Ring-shaped nucleus with micronucleus coming off; definitely more protoplasm than the previous form.

Fig. 12.—Early form with macro- and micro-nucleus and pale blue-staining cytoplasm.

Fig. 13.—Similar form, larger.

Fig. 14.—The nucleus has divided in this specimen, while there is only one micronucleus seen.

Fig. 15.—Both macro- and micro-nuclei are divided.

Fig. 16.—Micronuclei only have divided; macronucleus in process of division.

Figs. 17 to 26.—All are similar forms. They vary in shape and correspond closely with the forms seen by vital staining of emulsions of internal organs.

Figs. 20 and 22.—Show division of the micronuclei.

Figs. 21 and 22.—Show the third chromatin body described.

Fig. 25.—Shows division of macro- and micro-nuclei.

Fig. 27.—A single form, with macro- and micro-nucleus, and a very long flagellum.

PLATE 11.

FIGS. 1 to 12.—The specimens were found in smear preparations from the liver and kidney from rats infected with *T. rhodesiense*. They show dividing forms in various stages.

FIGS. 13 to 20.—Blood from liver of rat infected with *T. rhodesiense*. Immature trypanosomes are shown gradually merging into adult forms.

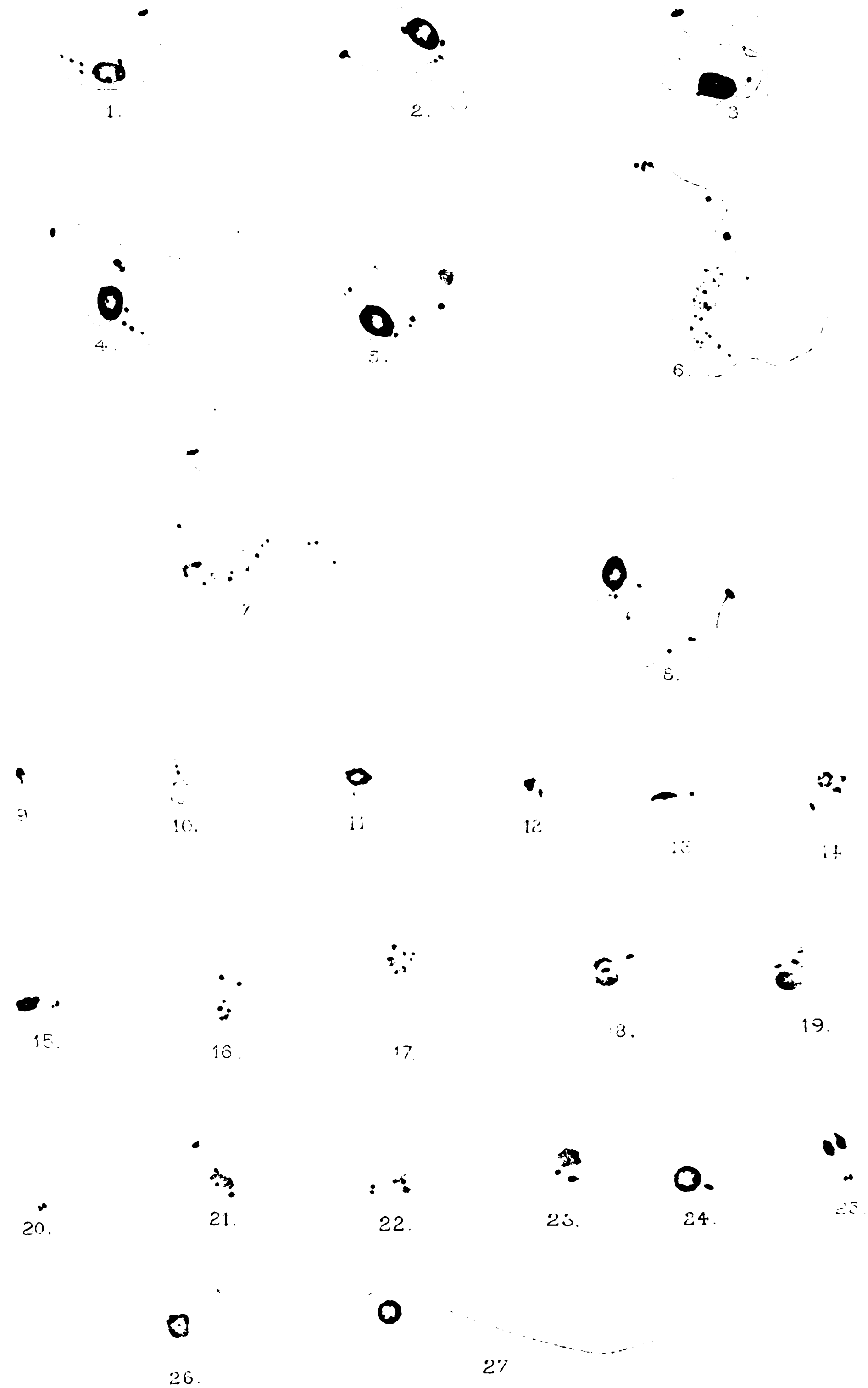
Fig. 1.—Early stage of division. There are already two micronuclei, but the macronucleus is just beginning to divide.

Fig. 2.—This shows similar division to fig. 1, but a little further advanced. The macronucleus is now in the stage of mitosis.

Fig. 3.—Complete separation of macro- and micro-nuclei, but the flagella are not yet separated.

Fig. 4.—Two form with nuclei and flagella completely divided; one flagellum is much longer than the other and lies round the margin of the body.

Fig. 5.—Two form beginning to divide into two independent bodies which are identical with the early immature forms shown in figs. 13 to 15.



To illustrate "Further Researches on the Extrusion of Granules by Trypanosomes and on their Further Development."

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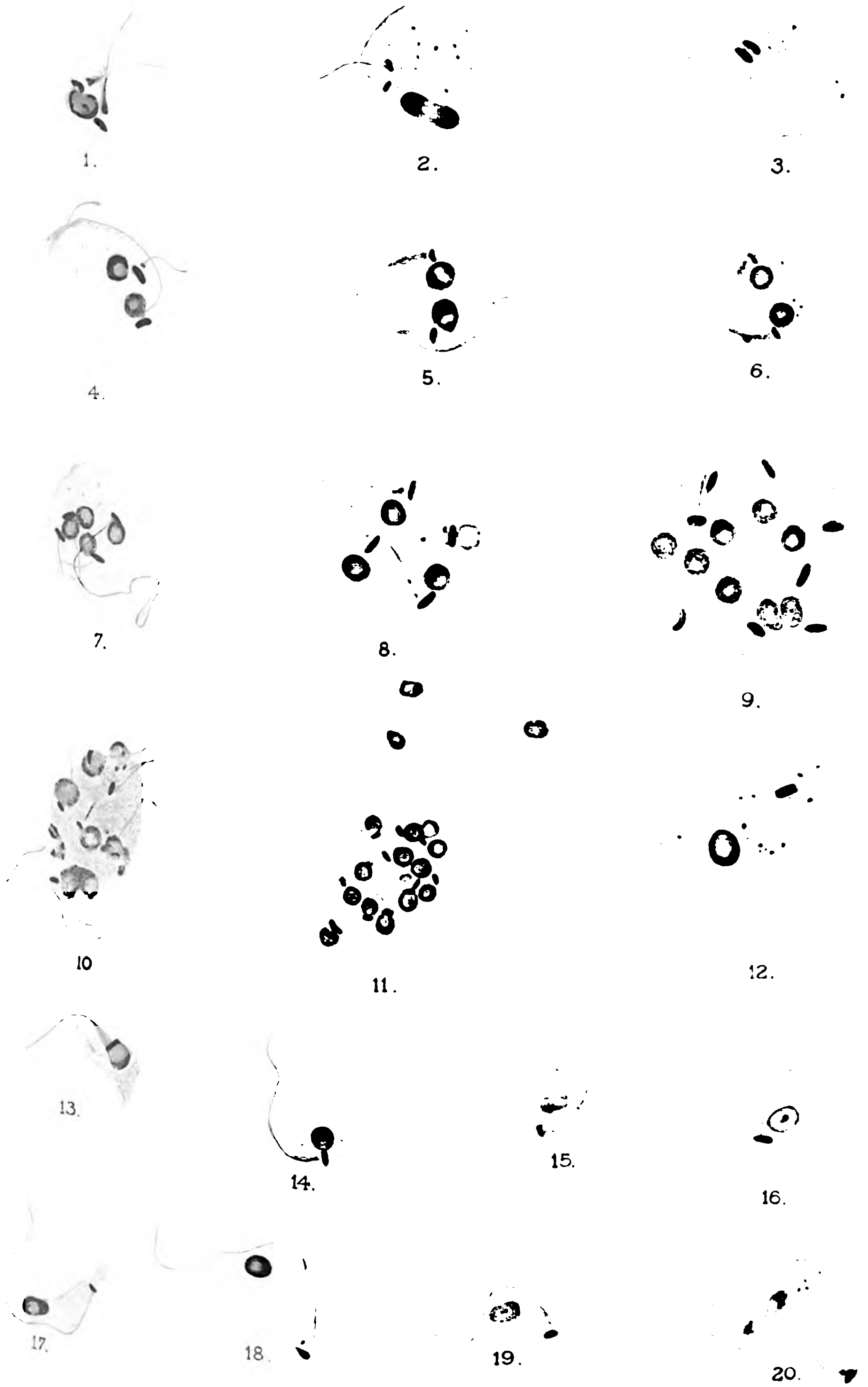

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Fig. 6.—Two form. The nuclei have moved to some distance from each other. A thick fan is seen in the shorter of the two flagella.

Fig. 7.—Four form (early), the macronuclei have evidently recently divided. The two lower are moving away from each other; the upper have not completely separated.

Fig. 8.—More advanced four form; all the pairs of macro- and micro-nuclei have moved away from each other.

Fig. 9.—Eight form, a large body of cytoplasm whose margin shows a few indentations as if there might later be division of the whole mass at these situations. All the macro- and micro-nuclei and flagella can be seen.

Fig. 10.—Eight form beginning apparently to divide; the cytoplasm shows lines of cleavage along the lower part of the outline.

Fig. 11.—Mass of sixteen bodies breaking up. These resemble the Leishman-Donovan body; each has a macro- and micronucleus, but no flagellum.

Fig. 12.—A large form with single macronucleus and large micronucleus showing fan-shaped origin to flagellum.

Fig. 13.—The body is rounded and has a clear blue-staining cytoplasm. The flagellum shows the fan-shaped origin well and stands straight out from the body. The micronucleus lies close to the macronucleus.

Figs. 14 and 15.—The body is longer, and the flagellum is lying along the margin; the micronucleus is now moving away from the macronucleus.

Figs. 16, 17, and 18.—These features are more marked, and the specimens show gradual approximation to adult type. The flagellum is seen to be separated at some point from the outline of the trypanosome body, the earliest stage in the development of an undulating membrane.

Fig. 19.—The undulating membrane is now clearly present, but the trypanosome can still be recognized as immature by the fan-shaped origin of the flagellum and the pale homogeneous cytoplasm.

Fig. 20.—An early adult trypanosome; the flagellum no longer shows the fan-shaped origin, and is much longer. Early granules can be seen in the cytoplasm.

HEAT-STROKE.

By M. S. PEMBREY, M.A., M.D.

An analysis of the reports of fifty recent cases of heat-stroke among British troops in India was undertaken because the subject needs further investigation, not only on account of its practical importance, but also on account of the difference in opinion regarding its causation. The old view, supported by the clinical observations of many medical officers in the Services, and by the experiments of physiologists, is that "heat-stroke" is due to a failure of the regulation on exposure to excessive heat and moisture. The recent view that the disorder is an infective disease was brought forward by Sambon [1] and has been supported by Manson [2]. These two observers have taken up such a definite position against the old view that it is necessary to examine critically the evidence for and against both views.

Heat-stroke has been most prevalent among men exposed to a high and moist temperature, and to the effects of muscular work under unsuitable conditions. It will be well, therefore, to consider the effects of the following possible factors: (1) Exposure to a high and moist temperature; (2) muscular work; and (3) conditions which render the effects of the previous factors more marked, such as unsuitable clothes, heavy loads, and debility due to alcohol or other causes.

(1) There is now general agreement that the exposure of healthy men and animals to a warm atmosphere laden with moisture will cause a rise in the internal temperature by preventing the loss of heat which in a dry but hot atmosphere would be caused by the evaporation of water from the skin and respiratory tract. As long ago as 1775, Blagden and Fordyce [3] observed their temperatures after remaining in heated rooms and found that the effect varied according to the amount of moisture present in the air; thus, after they had remained for fifteen minutes in a damp room heated to 129·9° F. (54·4° C.) the temperature of the mouth and urine was 100° F. (37·8° C.), but a similar exposure in a dry room heated to 239·9° to 260 F. (115·5° to 126·7° C.), and so hot that beef-steaks were being cooked by the heat of the air, did not raise their temperature. Into this heated room two jars of water were brought, and a layer of oil was poured on the surface of the water in one, with the result that the water soon boiled owing to the absence of evaporation; the water in the

other jar did not reach a temperature higher than 172° F. (60° C.), evaporation taking place freely from the surface and thus cooling the water. In such hot atmospheres the loss of heat by radiation and conduction has ceased and the temperature of a man would rise if the evaporation of sweat did not cool the surface of his body. If the air be moist as well as hot the evaporation of sweat cannot proceed rapidly enough to prevent the temperature of the body from rising.

It is unnecessary to give here an account of the numerous experiments [4] which have been made upon this subject since the time of Blagden and Fordyce; it will be sufficient if attention is drawn to the important observations of Haldane [5]. His results show that in very warm air it is the temperature indicated by the wet-bulb thermometer which determines the ill-effects produced in man. The limits of a man's power of accommodation are passed when the temperature of still air as shown by the wet-bulb exceeds 88° to 90° F. (31·1° to 32·2° C.), even if the man is stripped to the waist and is doing no work. In air moving at 2 miles an hour the critical wet-bulb temperature rose to about 93° F. (33·9° C.). Under such conditions the temperature of the body rises steadily, the pulse becomes rapid, and there is profuse sweating, accompanied by dyspnœa and exhaustion. When muscular work was performed the rise in the temperature of the body was much more rapid and began when the air was at a much lower wet-bulb temperature—about 80° F. (26·7° C.).

Nothing demonstrates more clearly the function of the sweat than the effect of absence of sweating when the heat of the body is increased. Zuntz [6] and Tendlau made observations upon a man whose skin was devoid of sweat glands. His temperature rose to 102·2° F. (39° C.) when he was exposed to the heat of the sun in summer, or when he did muscular work for a short time. The blood-vessels of his skin were dilated in a normal manner, but radiation and conduction of heat were not sufficient to prevent his temperature from rising when he worked. He overcame this serious difficulty caused by the absence of sweat by frequently soaking his shirt in water; the evaporation of the water cooled his skin.

The rise in the temperature of the body on exposure to a hot atmosphere laden with moisture is not due only to the hindrance to the loss of heat, for when the internal temperature rises the respiratory and nitrogenous exchanges [7] are increased. The body produces more heat and thus a so-called "vicious circle" is set up and will end in death unless the temperature be reduced.

(2) Muscular work is the next factor to consider, for many lives have been lost during forced marches when the air was hot, moist and stagnant. Numerous observations upon the influence of muscular work upon the temperature of man have been made by different investigators, but the results have been discordant. The general opinion held by physiologists and physicians until a few years ago was that muscular work did not raise the temperature of the body; it was granted that more heat was produced, but it was maintained that the body was compensated, or even over-compensated by an increase in the loss of heat. This conclusion was based in nearly all cases upon the results obtained from observation of the temperature in the mouth. Such a determination of the temperature is unreliable owing to the cooling of the tissues which surround the buccal cavity; this is especially the case after muscular exercise, for there is then a greater loss of heat from the rapid breathing and from the evaporation of moisture. Data so obtained do not justify the conclusion that the heat of the body does not increase during muscular work. Anyone can answer the question for himself by making experiments, but the experiments must be exact; the temperature should be taken in the rectum.

Muscular exercise *does* cause a rise in the temperature of the rectum and urine of healthy men. A certain increase in the heat of the body is an advantage for the efficient performance of muscular work. As the result of vigorous exercise the internal temperature may rise as high as 101·3° F. (38·5° C.) or 102° F. (38·9° C.), without causing distress or any pathological effects. The experimental data and a critical examination of previous work upon the subject have been given elsewhere [8] and it is only necessary here to give examples for soldiers on the march. During the experiments [9] made at Aldershot, 359 observations on thirty-four days were taken of the rectal temperature of twenty-one men after marching short distances: the maximum temperature was 102·4° F. (39·1° C.), the minimum 98·8° F. (37·1° C.), and the average of the mean after the march on each day 100·7° F. (38·2 C.). These figures are certainly somewhat under-estimated, for it was not possible to take all the observations immediately after the march, and it is known that the temperature begins to fall directly the work is at an end. When the temperature of the air is high, both by the dry- and wet-bulb thermometers, the effects of exercise are more definite and the evaporation of sweat must be greatly increased in order to cool the body. This is shown by a comparison of the following results obtained when the same march of seven miles was performed by

the same men on hot and cold days with the same clothing, equipment and load.

Number of men	Increase in pulse			Increase in rectal temperature—F.			Loss of moisture from body in grammes			Increase in weight of clothes from moisture in grammes			External temperature F.	
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Dry bulb	Wet bulb
4	84	52	62	2·3°	0·6°	1·4°	2,390	1,140	1,816	640	60	320	79°	67·5°
4	24	8	14	1·6°	0·0°	0·8°	555	300	419	40	0	27	45°	38°

The effect of work in a hot, moist and still atmosphere is to increase the temperature, pulse and loss of moisture out of proportion to the work done. Efficient work cannot be performed unless the temperature of the body is prevented from rising above a certain optimum. The temperature depends upon the production and the loss of heat; work increases the production and the passage of more blood through the vessels of the skin and the evaporation of sweat increase the loss. A hot, moist and stagnant atmosphere hinders the loss and taxes the power of accommodation.

The exchange of material in the body is enormously increased by muscular work, and this involves far-reaching effects on all the systems, for the body works as a whole. In order to supply the requisite energy for the muscular work there is an increase in the ordinary destructive side of metabolism, and this is shown by the greater amount of oxygen absorbed and carbon dioxide discharged. The increased combustion is accompanied by an increase in the production of heat. The greater activity of the lungs necessitates a more rapid supply of blood, and for this purpose the activity of the heart must be increased. For other reasons, also, this is necessary; the muscles require more blood, not only for the supply of material, but also for the removal of waste products; the nervous centres demand more arterial blood and, if the muscular work be prolonged, the sweat glands must be flushed with blood so that they may copiously secrete sweat and thus assist in the discharge of any excess of heat. Increased activity of the heart is not the only requirement. An adjustment in the distribution of the blood must take place and this demands the co-ordinated activity of the vaso-motor centres. Stress is rightly laid upon this increased demand upon the vascular system during muscular work, for in many cases of heat-stroke marked cardiac disturbance has been observed, and it is recognized that men with weak hearts are very liable to heat-stroke.

(3) The regulation of the temperature of the body involves the

adjustment of the chief systems of the body. It is to be expected, therefore, that even a healthy man may fail in this adjustment, if he be hampered by unfavourable external conditions. It has been shown already how a moisture-laden and hot atmosphere interferes with the loss of heat, and this effect becomes much greater if the air be stagnant. It has been proved also that muscular work raises the temperature of the body. Unsuitable clothes, equipment and heavy loads throw an extra tax upon the power of accommodation; this is not only known from daily experience, but has been proved by the experiments performed by Zuntz and Schumburg [10] and those carried out at Aldershot [11].

It is well known that alcohol produces a diminished efficiency in the regulation of temperature. The normal reaction to heat or cold is blunted or even paralysed by large doses of alcohol. Some of the lowest temperatures recorded in man have been found in the case of drunkards exposed to cold; men with a rectal temperature as low as 75·2° F. (24° C.) have recovered under careful treatment and nursing. On the other hand, the disordered regulation produced by frequent drinking may exhibit itself as a high temperature when the man is exposed to a hot, moist and stagnant atmosphere.

Debility from any cause will diminish the efficiency of the nervous regulation of temperature, and this is a factor which must always be considered in cases of heat-stroke.

After this brief consideration of the physiological aspects of the question, it is necessary to state in more detail the position maintained by Sambon and Manson in support of the view that "heat-stroke is a well-defined and possibly specific fever, having a peculiar endemicity and assuming at times in the endemic area almost epidemic characters." Sambon and Manson draw a distinction between "heat exhaustion" and *siriasis*, the term they use to include cases of so-called sunstroke, heat-stroke, insolation, heat apoplexy, heat asphyxia and thermic fever.

Sambon states that "siriasis is unknown in Europe. Cases mentioned in England, France, Germany and Italy as 'sunstroke' are always mistaken cases of syncope, delirium tremens, cerebral hæmorrhage, tuberculous meningitis, or cerebrospinal fever." It is maintained that heat alone cannot account for the disorder, that "the symptoms of the disease, its relapses, its morbid anatomy, its peculiar geographical distribution, its epidemic outbursts, the conditions of climate and soil under which it prevails, the relative immunity to its attacks afforded by acclimatization, all clearly point to the specific infectious nature of the disease."

A criticism of a theory advanced by experts in tropical diseases will be suspect if it comes from a physiologist; to minimize this objection the arguments will be based, not upon opinion, but upon experimental and clinical observations. The physicians of Europe must answer for all their mistaken diagnoses of "sunstroke" in their countries. Cases exhibiting the characteristics of heat-stroke have been observed in England among men, sheep and horses; the same factors appear to operate in the causation of the disorder—a hot, moisture-laden and still atmosphere and muscular work. Similar treatment, the artificial reduction of temperature, produces satisfactory results in both man and animals. Experimentally a condition similar to heat-stroke can be produced in animals, and, at any rate for the early stages, has been produced in man, as the observations of Haldane, Sutton [12] and others have shown.

On the other hand, the transmission of a specific fever, "siriasis," has not been shown experimentally on animals or clinically on man. The hypothetical microbe has not been demonstrated. Further, it is not correct to maintain, as Sambon and Manson do, that the cases of heat-stroke occur mostly at night during the coolest part of the twenty-four hours and without any close relationship to heat waves. Rogers [13] has worked out the data for the temperature and moisture of the air at the time of the occurrence of 363 cases of heat-stroke in the British Army in India during three years; the results show that a very large majority of the cases occur during the hottest months of the year and the onset is generally during the hottest period of the day. The figures also indicate that moist heat is a more important factor than dry heat.

It is important that further observations should be made to determine between the rival views, for it is obvious that if "heat-stroke" be a specific fever the methods to be adopted for its prevention and treatment must be based upon bacteriology. If, on the other hand, "heat-stroke" is a disordered condition of the regulation of temperature due to exposure to heat, the principles of physiology and general pathology must be the guide.

The following analysis of fifty cases reported in the British Army in India between June, 1909, and September, 1910, was undertaken as a preliminary to further investigation, and nothing more is claimed for it.

The clinical reports are not complete in some details, but the following are the points of chief interest:—

Mortality.—Twenty per cent.

Age.—The distribution is shown by the following table:—

Age	All cases	Fatal cases
20—21 years	6	1
22—23 ,,	9	—
24—25 ,,	12	1
26—27 ,,	8	1
28—29 ,,	4	2
30—31 ,,	3	1
32—33 ,,	2	2
34—35 ,,	2	1
36—37 ,,	2	—
41 ,,	1	1
	49	10

Service in India.—The shortest service was seven months, the longest ten years and a half. The average service in eight fatal cases was four years and a half, with a range from two years to ten and a half years.

District.—Thirty of the cases are reported for Multan.

Temperature of the Air.—In 25 cases the temperature of the air by the wet-bulb thermometer was 80° F. (26·7° C.) or over ; in 8 cases 84° F. (28·9° C.) or over, and in 5 cases 85° F. (29·4° C.) or over.

The highest record by the dry-bulb thermometer was 112° F. (44·4° C.), with the wet-bulb at 82° F. (27·8° C.); the lowest record by the dry-bulb was 86° F. (30° C.), with the wet-bulb at 76° F. (24·4° C.).

The highest record by the wet-bulb thermometer was 86° F. (30° C.), with the dry-bulb at 108° F. (42·2° C.); the lowest record by the wet-bulb was 67·8° F. (19·9° C.) with the dry-bulb at 94·8° F. (34·9° C.).

Muscular Work as a Factor.—In 23 cases, muscular work in the sun was a possible factor, and in 12 of these the evidence is good.

Unwell before Attack.—In 18 cases the patient felt slightly unwell for a day or two before the attack.

Attacks at Night Time.—In 4 cases it is noted that the patient was found during the night unconscious and breathing heavily.

Temperature Deg. F.	Temperature Deg. C.	All cases	Fatal cases
101—102	(38·3—38·9)	2	1
103—104	(39·4—40·0)	5	—
104—105	(40·0—40·5)	7	—
105—106	(40·5—41·1)	2	—
106—107	(41·1—41·7)	6	—
107—108	(41·7—42·2)	12	2
108—109	(42·2—42·8)	6	1
109—110	(42·8—43·3)	5	2
110—111	(43·3—43·9)	4	4
		49	10

Internal Temperature.—In not all cases could the temperature be taken before the treatment began.

The temperature of the fatal cases is given in more detail below :—

	Deg. F.	Deg. C.
Case No. 7	109	(42·8) in rectum.
,, 8	110	(43·3) in axilla.
,, 12	110	(43·3) in rectum and axilla.
,, 17	107	(41·7) post mortem.
,, 18	109·6	(43·1).
,, 19	109·2	(42·9) in rectum ; 104° F. in axilla.
,, 21	111	(43·9) in rectum post mortem.
,, 25	108	(42·2) in rectum.
,, 32	101	(38·3) cardiac disease, "heat exhaustion."
,, 41	110	(43·3) post mortem.

Question of Malaria.—In 21 cases the blood was examined for the parasites of malaria; the result was negative in 19 cases and positive in 2.

Question of Alcohol.—From the reports the following table can be made :—

Drinker		Moderate drinker		Non-drinker	
Total cases	Fatal cases	Total cases	Fatal cases	Total cases	Fatal cases
7	4	7	2	7	1

Question of Sweating.—In several cases it is mentioned that there was a complete absence of sweating.

Post-mortem Examination.—In one case definite evidence of heart disease was found, in another there were slight signs of cirrhosis of the liver. In 5 cases the cerebro-spinal fluid was examined and in one of these was found a bacillus which could not be identified.

Treatment.—Cold water or iced water douche and iced water enemata gave excellent results. In several cases it is mentioned that antipyretic drugs were tried without success.

As a preliminary account this article may be sufficient, but it is clear that other points require discussion, such as the question of the chemical action of the sun's rays, sweating, treatment, the after-effects, the loss of efficiency and the causes of death. These will be taken up in a subsequent paper.

Great credit is due to the medical officers of the British Army for the valuable observations which have been made upon this subject during many years, for the introduction of the most practical and efficient treatment, and for a general recognition of external heat as the important factor. It is possible, however, that the enormous success of bacteriology in recent years may

lead to the acceptance on insufficient grounds of the view that "heat-stroke" is a specific fever. The time, therefore, has come for conclusive observations and experiments to decide between the rival theories and thus enable preventative measures and treatment to be based upon scientific evidence and to be strictly enforced to prevent the toll which as death, disease and inefficiency is year by year exacted by "heat-stroke."

REFERENCES.

[1] SAMBON. *Brit. Med. Journ.*, 1898, vol. i, p. 744; 1899, vol. ii, p. 650.
[2] MANSON. "Tropical Diseases," 1907, p. 341.
[3] BLAGDEN and FORDYCE. *Phil. Trans.*, London, 1775, vol. lxv, Part I, pp. 111, 484.
[4] *See* article "Animal Heat," in "Text-book of Physiology," edited by Schäfer, 1898, vol. i, p. 814.
[5] HALDANE. *Journ. of Hyg.*, 1905, vol. v, p. 494; *Science Progress*, January, 1908.
[6] ZUNTZ and SCHUMBURG. "Studien zu einer Physiologie des Marsches," Berlin, 1901, s. 311.
[7] SUTTON. *Journ. Path. and Bact.*, 1909, vol. xiii, p. 62.
GRAHAM and POULTON. *Quart. Journ. Med.*, 1912, vol. vi, p. 82.
In these papers lists of references are given.
[8] PEMBREY and NICOL. *Journ. Physiol.*, 1898-9, vol. xxiii, p. 386.
PEMBREY, ARKLE, BOLUS, and LECKY. *Guy's Hosp. Reports*, 1902, vol. lvii, p. 283.
[9] "Committee on Physiological Effects of Food, Training, and Clothing of the Soldier," Second and Fourth Reports, 1908, *Journal of the Royal Army Medical Corps*, 1909, vol. xii, p. 211, and 1909, vol. xiii, p. 592.
[10] *See* [6].
[11] *See* [9].
[12] *See* [7].
[13] ROGERS. Proceedings of the Physiological Society, *Journ. Physiol.*, 1907-8, vol. xxxvi, p. xxviii; JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1908, vol. x, p. 25.

CONCERNING SOME THINGS LITTLE UNDERSTOOD.

By Colonel R. H. FIRTH.

In that this article touches upon debatable points and, in some parts, traverses the borderland between science and metaphysics, the arguments may not be acceptable to all readers. No apology is offered for its submission. It is put forward in no controversial spirit, but, rather, planned to stimulate thought upon subjects which we, as members of a scientific corps, are bound to think about and not infrequently to express an opinion.

A few weeks ago I was staying in the family of one of our officers. They had a child with whom I was soon on confidential terms. The main outcome of that intimacy was that I was made to read constantly aloud from the child's favourite book. That book was called " The Chance World," a book I had not seen since I myself was a child and had long since forgotton. It described a world in which everything happened by chance. The sun might rise or it might not: it might appear at any hour or the moon might rise in its stead. Even the children might be born with one head or half a dozen, and those heads might or might not be on their shoulders but arranged in all sorts of queer situations. If a person jumped up in the air there was no certainty as to whether he would come down again. Further, if he did come down again yesterday there was no guarantee that he would do so to-day or to-morrow. Thoughout this odd yet fascinating book every day antecedent and consequent varied, and gravitation and everything else which we associate with what are called natural laws changed from hour to hour. For instance, to-day a child's body might be so light that it was impossible for it to get down from a chair to the floor; while to-morrow, in attempting the effort again, the impetus might drive it through a three-storeyed house and dash it to pieces somewhere near the centre of the earth. The world pictured in this book was all chance, for cause and effect were abolished. In a word, all "law" was annihilated. Like all children, the child to whom this book belonged put me many questions; some were very difficult to answer. Not the least disturbing was the quaint question whether gollywogs and fairies did all the funny things such as we had been reading about. The outcome of the catechism to which I was exposed was that one began to think, and the musings which followed seem worthy of general consideration.

The first thoughts which came to one were that to the inhabitants of such a "chance world" the result could only be that reason would be impossible; in truth, it would be a lunatic world with a population of lunatics, or no more than our present world would be without law or the universe without the principle of continuity. This thought naturally led to the appreciation of the necessity for some principle according to which laws shall actually be continuous throughout the universe. If we, as rational and moral beings, depend on Nature for any given result, we demand a pledge that our intellect shall not be insulted nor our confidence in her abused. The existence of this principle of continuity is demanded as the expression of "the divine veracity in Nature." It is not easy to explain what this principle of continuity is, but it is, nevertheless, so fundamental to human intuition as to be believed by all and acted upon universally. It may be described as the universal experience of mankind upon which the value of all experiment depends, the constant fact that precisely similar effects follow precisely similar causes. The whole of human knowledge would seem to depend upon this being true.

Having framed definite ideas of this principle, the thought quickly follows: since natural laws are continuous through the universe of matter and space, are they continuous through the world of spirit? or, as the child would have put it, could she have so expressed herself, do the fairies and gollywogs live in a world in which there is no continuity of natural laws? The thoughts which arise out of this apparently simple question are many, and lead one on to very difficult ground. Suppose we deny the existence of what we call natural laws and continuity of them in the super-normal world or universe of spirit, we are open to the demand that we must furnish the disproof; but the real question is, are we justified in taking up that position? The answer to this thought was forthcoming from reflections arising out of another incident which may now be discussed.

At a recent dinner party, the conversation drifted, as it so often does in India, to the subject of what is called the supernatural, that is to spiritualism, telepathy, and the whole range of topics classed under neo-vitalism. As one supremely ignorant of these matters, one's rôle was rather that of a listener and learner than that of a critic. Two of the guests were evidently ardent believers in the occult, and one listened with interest to some extraordinary accounts of not only the comings and goings, but of the actions of spirits. As explanatory of these manifestations of the unseen

world much was said of the influence or action of what was described and spoken of as "psychic force." The conversation naturally made an impression on one, but, as one listened and subsequently thought over the question, certain difficulties presented themselves.

One can accept the idea of the passive existence of a spirit alleged to be non-material, as it is clearly beyond our means of examination or proof. But when it comes to hearing that such a spirit was concerned in moving matter and exerted a "vital or psychic force" very grave difficulties arise calling for critical analysis. In the first place, what do we mean by a "force"? A force is but a name for the influence by which a portion of matter tends to change the direction of motion of some or any other portion of matter. If the distribution of matter be known then the forces in operation are known. Since the law of the conservation of energy declares that no force is ever destroyed, but merely transformed into force of another kind, we are face to face with this situation that, if this so-called "psychic force" is consistent with the conservation of energy, we must abandon the view of the conservation of matter. Few of us are prepared to do that. If we assume the existence of any new force we must assume the existence of new matter, otherwise the conception of a new force is meaningless. The neo-vitalists and exponents of what they call "psychic force" would imply that an atom in motion may and does change its direction of motion without a material cause. If this be so, it is quite obvious that the use of the term force is a misnomer and certainly distinct from the ordinary meaning of the word "force." Such a force must act in some direction or other, and since action and reaction are equal and opposite the origin of that force must be affected by the material atom and have a situation in space. In other words, if there be such a thing as psychic or vital force it is endowed with material attributes.

We come now to another question: What evidence have we that such a thing as psychic force exists at all? Practically none. What evidence there is resolves itself into a statement of difficulties associated with explaining alleged phenomena on any other assumption. The only assumption which seems acceptable is that if spirits exist and do acts, their doings are no exception to the general law that every physical event has a cause, that is to say, that it follows or originates from some pre-existing event of the same material character as the other. This may be termed pure

mechanism, and it is argued in favour of a so-called psychic force, as explanatory of certain mysterious phenomena, that it is incredible that these complicated facts should be due to mere mechanical causes. It is more incredible that these complicated facts should be uncaused. There are many things in this world of which we are not able to describe or explain the immediate causes, but the recognition of this fact is no argument in favour of their having no cause at all, or for going out of our way to conjure up a hypothetical cause or so-called "force" which is inconsistent with physical laws and forces of which we have exact evidence.

It may be argued that a mere adherence to mechanism is incompatible with teleology, in that life is purposive and implies a psychical factor or will to live, while mechanism is non-purposive. Let us see how far this is true. Suppose we take natural selection as an example. By this theory every organism is adapted to its environment and evolution renders the adaptation more perfect; surely, then, the purpose of evolution is adaptation? It may be objected that natural selection is not all-sufficient to explain biological evolution; even so, we cannot get away from the fact that it is an operative factor in securing adaptation and that, although mechanical in operation, it leads to purposive results. Here, then, "purpose" expresses mechanism in terms of teleology, and teleology in terms of mechanism. Again, suppose we take any particular flower with some distinctive odour which attracts insects of a particular kind. In the course of evolution those flowers which fail to develop the special odour will not attract the particular insects, and remain unfertilized, while those endowed with the strongest odour will be all the more sure of fertilization and propagation of their kind. Or, suppose we take any one of the many insects which for self-preservation assume by evolution a colour and form resembling a dead leaf. All such insects which fail to look like dead leaves will be seen by birds and eaten without due propagation of their kind. In neither of these instances is there any struggle for existence, and only by a stretch of the imagination can we suppose that either the flower or the insect displays any will to live. Regarded in this way natural selection is devoid of a psychical factor and wholly impassive. We, therefore, come to this, that the purely mechanistic conception is not antagonistic to purpose, and the falling back upon or alleging the existence of a psychic force to explain a cause of events is merely a verbal expression to conceal the incomprehensibility of an alleged fact.

If we could obtain a solution of the problem raised by the

statements of the vitalists and spiritualists we might advance in respect of some metaphysical questions. That solution appears to lie in a consideration of the metaphysical bearings of mechanism or materialism. We all know that a human being is nothing but a complicated machine and that all its actions are explicable from the basis of matter and energy, without introducing or assuming consciousness. Of that consciousness and individuality we are all aware. The question suggests itself, suppose we were able to build up synthetically a living man and were able to ask him "Do you feel?" he would reply "Yes." This somewhat startling thought is surely justifiable, in that this synthetic man is only matter and energy, and that he feels is nothing more nor less than that a certain part of his mass is functioning in a certain way. Without that functioning of his brain he could not feel, therefore the functioning is the feeling; or, to put it another way, the feeling is but matter in motion and this matter in motion is feeling. Conversely, we are compelled to say that feeling is matter. Developing the thought still further, we are forced to admit that the feeling is but a manifestation of consciousness or mind, and as feeling is matter then matter is only a mode of consciousness or mind. At first, this idea is disturbing, but it really need not be so, as we clearly know nothing of matter in the absolute, but know of it only through sense impressions. This brings us to the conclusion that consciousness of mind as an entity must be fictitious, and that, after all, thoughts in the concrete are made of the same stuff as material things are.

Reverting once more to our spiritualistic friends at the dinner-table and their views, we arrive at the conclusion that their conceptions convey a meaning only in so far as they are materialistic, and that the purely mechanistic outlook is not inconsistent with physical or biological facts, and is helpful as to metaphysical questions. The conclusion, however, does not force us to close our minds absolutely to the views and possibility of there being a super-normal world or world of spiritual forms. On the contrary, there is much to warrant the belief that there is such a super-normal world which, to most of us, is an invisible world. To many, the negation of such an unseen world would be painful, and to them the beautiful clause in the Christian creed which speaks of a communion of saints expresses an idea which is full of comfort, especially if they have lost earthly friends or relations to whom they were attached. In writing these thoughts, therefore, one does so with full regard for the feelings of others who may not be attuned to the cold and

hard arguments of what may be called a scientific article. Speaking for oneself, these musings force one to confess a belief in the existence of a super-normal world, but on the condition that such is operating by and through physical agencies. It is true we know little about this super-normal world, but that does not warrant our denying its existence. On the contrary, in spite of the charlatanry which has been associated with its cult, there are some reputable facts which suggest the need to keep an open mind regarding it ; the difficulty lies in how we are to explain the many imperfectly understood and recorded facts on a material basis reconcilable with modern knowledge. It may not be time wasted if we think over the question.

In an earlier stage of this article, one has laid stress on continuity. We need to avoid associating or confusing continuity with the duration of an effect. The latter has nothing to do with the former, which concerns only the sequence of causes, and the unexpectedness of any appearance is no index of a breach of continuity. To an uninformed person, the appearance of a precipitate when one mixes a clear solution of common salt with a clear solution of silver nitrate is unexpected and suggestive of discontinuity ; but to the informed person the appearance of that precipitate does not suggest breach of continuity. The question is, why should we regard the unexpected appearance of a visitant from the unseen world as suggestive of a discontinuity? To do so is merely to admit we are in the position of the uninformed person who is astonished to see a precipitate result from the mixing of two clear liquids. Similarly, if we burn a piece of paper in a sufficiently hot flame we get smoke and vapour; these are continuous and direct representatives of the paper, there has been no breach of continuity though we have destroyed the familiar material form. Further, it will be conceded that we cannot conceive apparent action at a distance, whether it be gravity, electricity, magnetism, or will-power, without there being a medium for the transmission of the energy displayed, and a still greater difficulty is to appreciate or understand the method by which it acts on our senses.

These difficulties are lessened if we think for a while concerning what we mean by matter, and what we know of the great forms of energy called heat, light, electricity, and magnetism. We cannot think of matter in these days as being merely a something separable into the ordinary chemical elements, or that its constitution is expressible as a grained structure built up of variously sized entities, called atoms. True, the atom is chemically the smallest

amount of matter which can enter into combination, but in the light of our newer knowledge it is a shell of positive electricity within or without which groups of electrons of negative electricity, in varying numbers for each element, revolve with inconceivable velocities under electrical attractions and repulsions. In other words, we can think of the atom as being physically a fixed form, as the result of rapid internal motion, just as the solar system is a physical atom and fixed form. Further, we picture all matter to be composed of these atoms and to be made solely of electricity or something closely allied to it.

When we come to think of heat, light, electricity, and magnetism, we at once admit that they are real, but they have not the properties of matter by which it is ordinarily defined, except, perhaps, of inertia. They are all convertible, but yet cannot be isolated. We cannot even think of them as mere properties of matter. Yet we know that a hot pound of iron weighs the same as the corresponding mass cold, and the same is true if the iron be magnetized or be charged with electricity. We know that glass is opaque to electricity, but transparent to heat and light; all metals are opaque to light and transparent to electricity; almost all substances are transparent to magnetism, while others, like rock-salt, are almost opaque to heat yet transparent to light, and tourmaline allows only vertical light waves to pass through. These accepted facts compel us to think of heat, light, electricity, and magnetism as things permeating so-called matter yet not affecting its mass and weight; also as occupying the same space at the same time, yet not excluded by the densest substances. We are forced to think of the influence of matter in the orthodox sense as extending only as far as its own boundary planes; while heat, light, electricity, and magnetism permeate and radiate in all directions. A further thought, however, reminds us that heat, light, electricity, and magnetism are vibratory in their nature, and as we are convinced that action at a distance without a connecting medium is inconceivable, it follows that all space must be, and probably is, filled by some medium closely related to these forms of energy. This hypothetical substance we call the aether, and it is in this all-pervading medium that magnetic and electric fields exist; its function is to act as the transmitter of motion and energy both in and to what we are accustomed to think of as matter. We know nothing of the exact nature of the aether, but the more we think of the phenomena which its evident existence explains, the more wonderful it seems. The aether clearly comprehends much for

which so-called matter has no analogues, and, by virtue of transient modifications, is the cause of the properties associated with so-called matter, and possibly under one permanent modification may be ultimate matter itself. This idea involves the conception that, by causes of which we have no knowledge, parts of this aether have acquired rotary motion, and are now the electron-laden atoms of which matter, as commonly spoken of, is constituted. In these atoms are entangled other portions of the aether to which certain other properties of matter are due, and by means of all these properties the universe is perceptible to our senses. Other portions of the aether in space are in simple vibratory motion carrying energy from the sun, which energy is manifested as heat and light.

These thoughts suggest the idea of a new order of existence which, as a whole, may be less complex, and its variations fewer than those of that smaller part of it which, differentiated from the greater part by rotary motion, we call matter. This conception permits us to think of light and heat to be but modes of vibration of the aether, that magnetism is an aetheric disturbance excited by streams of electrons freed from the atoms. It may be that the explanation of gravitation will be on similar lines. Musing in this way, we advance beyond the boundaries of a crude materialism associating matter only with mass or substance, and realize the conception that ultimate matter is represented by an intangible, invisible entity having a differentiating force or power, and from the latter it acquires those properties by which energy is manifest to us. If we can accept these arguments and deductions we must admit there is what, for want of a better name, we may call a soul of mass or substance, as represented by the aether, bound in or permeating substance, and that as the magnet is keyed to the aether so the whole physical universe is keyed to a sub-universe or unseen entity which is an integral of all mass or substance, yet not evident to our senses. The same arguments suggest the further idea that the ultimate cause of variation and of evolution is aetheric or psychic, acting by and through the mind or soul of living substance. If we ask ourselves what is living substance, the simplest definition is an organized aggregate of molecules which unceasingly is shedding old and incorporating new ones. As yet we do not know the force which can induce that mysterious polarization.

The critical reader may here say: But some persons claim and are credited with an ability to perceive evidence of an unseen universe, and, moreover, a very earthly and unscientific or un-

spiritual element characterizes their communications; how is that? Unless that reader has familiarized himself with all the literature bearing on the subject of so-called spiritualistic manifestations, he will be unable to appraise the evidence at its true value. One cannot here summarize what is an extensive literature, but of it this may unhesitatingly be said, that the greater part seems to call for much independent corroboration before it can be accepted. That some persons have the faculty of perceiving what we call the unseen or super-normal world is not inconsistent with truth, and that they are few and far between is not surprising. It is possibly but a question of evolution and that, as generations go on, more and more humans will acquire what one may conveniently call a psychic sense. That these alleged manifestations or communications from the unseen or super-normal world are marked by an earthly taint is a stumbling block to their genuineness, but, if we are judicial, we must admit that it is explicable from the circumstance that, however exalted the knowledge of those who originate the communication, it can only be received in language and form corresponding to the intellectual level of the recipients. For the present, the whole question calls for an attitude of reserve and the maintenance of an open mind, rather than one of direct negation simply because it does not accord with either personal experience or knowledge. It may be, however, not unprofitable to consider how far the alleged spiritual or neo-vitalistic phenomena are consistent with our knowledge.

The arguments so far bring us to the conclusion that mind and matter are not antithetical but rather parts of one great universe of substance. We also conclude that heat, light, and magnetism are mere modes of and definitely connected with the aether or soul of substance. Is it too much to assume that when the nature of this aether is better understood the mechanism of so-called occult phenomena may be plain to us? Suppose we consider the hypnotic phenomena. We are all familiar with the theory of the ordinary magnet. An unmagnetized steel rod consists of atoms which are potential magnets, but all the atoms are faced anyhow. If we stroke this rod with an already formed magnet then the atoms of the unmagnetized rod all face round one way and it becomes magnetized. We cannot say that anything has left the originally magnetized rod nor has anything been added to the newly magnetized rod, at most the forces resident in the latter have been directed. Some energy has been expended, but the original magnet is not weakened. We are unable to affirm

that the human body is composed of magnetic atoms exactly like those of the steel bar, but it is not unthinkable that the regular polarity of the human body may be similarly affected. This analogy goes far to explain some authenticated facts regarding therapy by human magnetism. The same analogy helps towards an understanding of hypnotic control. We know that a magnet has no special affinity for the iron as iron, but only for the contained magnetism. The magnet controls the "soul" in the iron, and any variation in quality or strength of the magnet is reflected or reproduced in the iron rod. If thought be a disturbance of the aether affected by animal or human magnetism, is it too much to suppose that a similar polarization of two organisms may go far to explain any transfer of thought between them? Of course, there are many gaps to be filled before we can explain the details or even give it unqualified acceptance; at present, we get over the difficulty by saying it is all "suggestion," which is synonymous with direction or control. Still, the possibility of something more than suggestion is probable when we remember that what we call our senses are nothing more than reports of certain tissues correlated to certain vibrations, and that there are many vibrations of which our senses give no report.

If we analyze the more reputable accounts of automatic writing and speaking we find much to suggest that these are phenomena similar to the hypnotic facts. The essential difference is that the agent or sensitive person is said to be mesmerized either wholly or in part. These are alleged facts difficult to explain otherwise than on the assumption that the so-called agent or medium acts in the personality of what might be called a controlling aetheric; if so, then we can only assume it is the magnetism of this invisible visitant which causes the involuntary words and acts of the medium. Where phenomena indicative of the underlying consciousness are exhibited, such as clairvoyance, clairaudience and precognition, we can only think of them as being due to the receptive faculty of the super-normal conscious element in us picking up vibrations of the aether which are unperceived by the normal consciousness. How many of us are able to deny that these super-normal sensations have never been felt by our normal personality when we give it opportunity for intro-cognition? Probably few, in spite of the rarity of the occurrences. One is tempted here to quote the following words from Kant,[1] which indicate that even so acute a

[1] Kant's Works, vol. vii, p. 32.

philosopher was not unattracted or repelled by such a view. His words are, "that also in this life the human soul stands in an indissoluble communion with all the immaterial beings of the spiritual world; that it produces effects in them, and in exchange receives impressions from them, without, however, becoming humanly conscious of them so long as all stands well."

Perhaps the most astounding and most difficult phenomena to think seriously about were the accounts which one's friends at the dinner-table gave of manifestations such as levitation, apparitions, the tying of knots in endless cords and the apparent penetration of matter by matter. One was tempted to smile and merely dismiss them as a farrago of nonsense accepted by credulous and illusioned people; but this attitude is hardly scientific and, as they were seriously vouched for, one could not avoid thinking them over and endeavouring to explain them, if possible. It is not easy to do so, but one's thoughts have run somewhat as follows. One remembers well a demonstration in a school class-room, in boyhood days, when a key was shown floating in the air, some nine inches from and yet anchored as it were to a table by a piece of string. This was, of course, but a well planned experiment to bring home to us the magnetic attraction of an electro-magnet. It made a great impression upon us all, and many of the smaller boys, who did not understand all that was involved, were fully convinced that what they had seen was magic. As one thinks over these alleged cases of levitation one can only conclude that we can give no explanation, and that one is in precisely the same condition of one's smaller schoolfellows who, at that demonstration, did not know or understand all that was involved in the phenomenon they saw.

One has never seen an apparition, though one has heard very succinct accounts of these materializations of the super-normal world. They present great difficulties, especially as we, living on a material or phenomenal plane, cannot comprehend anything as a reality apart from what we are accustomed to call matter. Maintaining the same attitude of open-mindedness and desire to explain what we do not understand, the only solution or partial solution of the difficulty seems to lie in framing an analogy from mathematics. In fact, it affords the only means of explaining the occurrence of a new order of being or any series of successive orders of existence. A point is self-centred and has no dimensions; if that point moves, it traces a line, which then has one dimension or length. Suppose that line moves, it traces out a plane, having two dimensions of length and breadth. If that plane moves, it traces out a cube or

other solid figure which has three dimensions of length, breadth and thickness and is bounded by planes. It is evident that the dimensions of length, breadth and thickness are not entities, but merely aspects of substance. Line, plane and solid figures are equally unreal, and except by the aid of substance are inconceivable. Now, if we imagine a point world, with a number of lines surrounding it, but whose consciousness is bounded by itself, then not until a line enters those limits can it be apparent to the point. In the same way, in a line world whose people were cognisant of only north and south, any number of planes might surround them, but they would not be seen until they entered that world, and even then only as a succession of lines coming suddenly from space and disappearing again. Similarly, we can think of a plane world whose people appreciate north, south, east and west. To them a figure of three dimensions could only be known by that part of it within range of their faculties. The approach of a sphere to such a people would be first as a small circle, then that would grow larger till its maximum diameter was reached, gradually it would lessen and finally disappear. Just as the sphere would appear to the people in a plane world as a plane figure (circle) suddenly coming from space, so an apparition from the super-normal world coming into the normal world can appear only as a material form, perhaps of greater or less tenuity, but all the same substantial.

It must be remembered that these mathematical analogies make no reference to the interior of any solid, which is a mere fixed form, unrealized in substance and also as imaginary as the point of no dimension or the plane of no thickness. Since each dimension is made visible by means of the next lower dimension, as the solid by planes, the plane by lines and the line by points, so a "body" is manifest or visible by the motion of a form and bound by fixed forms. If the analogy is correct, then this "body" is nothing but substance. On the modern electronic theory, all substance is made up of atoms, which are small but definite spaces or fixed forms retaining their form because of their motion and by virtue of the aether or true and ultimate matter, and around them are the apparent centres of forces which are the cause or source of the properties of substance, such as chemical affinity, colour, heat, light, and magnetism. These properties or manifestations of substance are synonymous with energy, and this brings us to a concept of the nature of the super-normal or unseen world. For, though energy is ordinarily apparent by the visible motion of the aether or ultimate matter, it is not necessary that the motion should be visible as such any more than the motion

of an atom is visible, but only that fresh motion of some kind be superadded. This brings us back to the concept of the soul of both living and dead substance, which is the aether, and, if Mendeleeff's theory be true, the aether itself is composed of particles and it is those aetheric particles which form or build up the electrons of the atom. The "soul" of vegetable and animal substance is confined within the limits of its own nucleated cells or forms, though it may radiate influence outside those cells or forms. The "soul" of dead substance is confined within the limits of its atoms or fixed forms. Planes limit forms, lines limit planes and points limit lines. In all these cases, the addition of new motion raises the manifestation one degree, and in each instance the persistence of the form depends on the persistence of the originating motion. The mathematical analogy, therefore, still holds good.

It is legitimate here to remark that when a well-known face is said to have appeared in the air and then vanished it suggests a creation and disappearance of matter; but it is not necessarily so any more than the formation of rain or snow from invisible water vapour implies the creation of new matter. Probably most of the alleged apparitions are subjective, the effect being produced by something acting on the brain of the perceiver, who interprets in terms of sight or hearing, and in a form of matter which he and his world know. We see here why nearly all apparitions are anthropomorphic, simply because no other would be understood. Without committing ourselves to the opinion that it is so, we can deduce from the foregoing analogies that, just as an appearing line would be above or below a perceiving point, and an appearing plane on either side of a line, and an appearing solid all round that part of a plane into which it entered, so an aetheric order of being is around and within a mundane being. The enthusiast would add that this aetheric order of being is not limited to any place, but manifest anywhere by and in appropriate substance. As we cannot disprove it, he is entitled to his opinion.

As for the tying of a knot in an endless or closed cord, that seems just as impossible and inexplicable to us who live in a space of three dimensions as would be the tying of a knot in an open cord for beings living in a space of two dimensions. To a person conditioned by two dimensions of space, an ordinary circle would appear to be a perfectly closed space, though it seems to us, who are conditioned by three dimensions, to be an open one. If we think it over, the access to the interior of a space which seems closed to us may require and probably does require fourth

dimensional powers; if this be so, then the fourth dimensional power may be no more wonderful to us than a third dimensional would be to a person having knowledge or perception of only two dimensions, and, consequently, may not involve any real interpenetration of matter by matter. A consideration of the mathematics of this question suggests that a fourth dimension may be referred truly to substance rather than considered as an axis of spatial measurement.

To be told calmly, as one has been, that signed and witnessed documents testify to the passage of a solid body through a wall or door by means of super-normal agency, makes a severe call upon one's powers of reason. It clearly implies that matter seems to penetrate and even disappear in other matter, which seems incredible. Here again are we to disbelieve it simply because we cannot understand it? One is very tempted to do so, but then if we are logical we should disbelieve the following, which is a matter of common knowledge. A gramme of oxygen at – 200° C. occupies 0·807 c.c. A gramme of sodium at ordinary temperature occupies 1·015 c.c. These two elements combine in such proportion that 46 grm. of sodium occupying 46·7 c.c. unite with 16 grm. of oxygen occupying 12·9 c.c. The sum is 59·6 c.c.; but 62 grm. of the compound occupy only 21·7 c.c. Nearly 38 c.c. have disappeared and we cannot explain the disappearance as due to pressure, for both sodium and liquid oxygen are incompressible. In this case, which is an accepted chemical fact, it is difficult to deny interpenetration of matter. If we deny in the one case we ought to deny in the other. One is not prepared to advise, but it is typical of some of the difficulties associated with this question and suggests a need for caution and the maintenance of an open mind when dealing with matters which profess to relate to a super-normal world. At the best, we can only say "not proven."

In closing this review with that verdict, one does so impressed with the inadequacy of one's treatment of the subject. The childish prattle of a little girl about her book and the ardent views of adults concerning things which are still largely mysteries have suggested a train of thoughts which may be of use to others when placed in a like situation. One has endeavoured to invite attention to psychic phenomena which at once attract the credulous and bewilder or irritate the sceptical. Frankly, one is of the latter, but matured reflection compels one to admit that, whatever the explanation of the phenomena be, we are in the presence of facts

which, though we may be sceptical as to their accuracy, still are of a nature to demand no off-hand attitude but rather sympathetic thought. Our difficulties lie in the use of the term matter or material. It may be that there is something wanting in our conception of the universe. We know that there are two kinds of electricity, each kind attracting its opposite and repelling its like. May there not be two kinds of matter as there are two kinds of electricity, that is, terrestrial and non-terrestrial matter—the one gravitating towards its own kind, and the other repelled from the substances of which earthly things are made? The fact that we are not acquainted with such matter does not prove its non-existence. Modern astronomical research suggests that many ill-understood anomalies concerning star movements will be and can be explained only on the basis of such a conception of a mutual repulsion and attraction of so-called matter. So long as our conception of matter is limited to gross material we can find no basis for any connexion between the alleged spiritual or super-normal manifestations and matter. If there be no connexion, or the absence of connexion involve the abandonment of the law of conservation of energy, then the idea of a sub-universe or unseen world is unacceptable and unthinkable. If, on the other hand, modern knowledge or the electronic theory of so-called matter be correct, then we can arrive at a conception that matter is synonymous with the aether, which is associated with all physical phenomena and permeating all material things. Of the nature and properties of that aether we have only partial knowledge; but, if the aether be ultimate matter, such knowledge as we do possess concerning the aether goes far to remove many of the difficulties which have stood in our way towards giving any sympathetic attention to the statements of those who believe in super-normal phenomena. It at once couples up those alleged phenomena with accepted physical phenomena on a basis consistent with physical agency, and does not violate the essential law of the conservation of energy. If this interpretation of the facts be correct then our difficulties are removed as to the existence of a sub-universe to which our phenomenal world is keyed, and that view is without prejudice to the accuracy or genuineness of the alleged phenomena of that sub-universe. Of these we may still say "not proven."

Apart from what has been said, the whole subject presents other wider and deeper aspects; these one has been careful to avoid discussing as they are unsuitable for our Journal, still the thoughtful reader will appreciate how much the facts bear on the greater

problem whether the human soul is but a name for the sum of vital functions, or has an objective existence, embodied and disembodied. One has endeavoured to be both logical and judicial, and, perhaps, the effort will not have been unprofitable if it do no more than stimulate thought upon matters which, despite the charlatanry with which they are associated, suggest both a message and a philosophy which some of us are apt to overlook. The message is, assuming that there are aetheric personalities associated with and surviving each human being and co-substantial with the causative energy, then man is now as immortal as he ever will be, and the conviction of this persistence after death is the intellectual warrant for all morality and altruism. The philosophy is, that if we are satisfied of the existence of a spirit world, then man has a direct normal access to the creative power, and that perfect spiritual relations can only be presented adequately in a perfect life, and that the perfect life will be a perfect reply to its circumstances.

ON THE PHYSIOLOGY OF THE OPEN-AIR TREATMENT.[1]

By LEONARD HILL, M.B.Lond., F.R.S.
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You heard on Wednesday Professor William Bulloch's lecture with regard to the infection of consumption, the origin of contagion, and so on. He laid before you the results that have been recently communicated by Hamburger, who reached the conclusion that 95 per cent. of all the children in Vienna, aged 15, are infected with tuberculosis. The evidence shows that the infection is not by the bowel, but by aspiration through the air, and the contagion is spread in almost all cases from man to man; milk is of very minor importance indeed. He concludes that almost every human is disposed to infection, and is infected in the conditions of city life; that a certain immunity to subsequent infection is established from the first infection, and that there is a great tendency to relapses with a later infection. The conclusion, then, is that practically all infection occurs in childhood through inhalation. The primary infection is through the lungs, but most children recover from that primary infection. There is a tendency to relapse afterwards, and that relapse may be due to reinfection, or to the old infection working out again. There are predisposing factors which bring about this relapse. Pulmonary tuberculosis is a late form of the disease; once started, it shows a tendency to increase. Therefore, supposing these conclusions are just—and there is a very great deal of evidence in favour of them, which Professor Bulloch brought before you—what we have to do is to take the greatest care in prophylaxis, to prevent infection during the first year or two, and in later life to prevent those conditions which bring about a relapse.

That brings me to the subject which I propose to deal with to-day—namely, the effect of open air and exercise, and how it is we believe, and what grounds we have for believing, that this is effectual as a method of treatment, or still more as a method of prevention; how it is that open air and exercise act, what the

[1] A lecture delivered at Brompton Hospital for Consumption and Diseases of the Chest, on Friday, March 7, 1913. Published by permission of the Editor of the *Lancet*.

physiological basis of this treatment is, and what effect they have upon the human body.

The Chemical State of the Air.

It has generally been supposed that all the bad effects of close, crowded, and confined places are due to chemical impurity of the air, that the air is contaminated by the exhalations of human beings, and that it becomes impoverished of oxygen; but if we consider what people complain of, we find that people who are in crowded and confined places never complain that there is too little oxygen in the air, or too much carbonic acid in the air. What they always complain of is the heat, and want of movement of the air. They say: "How close and warm it is! There is not a breath of air." "Let us go out and get cool," is the expression one hears in a ball-room. "Let us find a cool place." The ladies have fans, and they put on the thinnest clothes when attending social functions and so forth, all showing that what is felt is not chemical impurity, but some other conditions of the atmosphere which affect the heat loss of the body.

Excess of Carbonic Acid.

Now a great deal is made of carbonic acid in the air, but physiological experiment has conclusively shown that the percentage of carbonic acid in crowded rooms has nothing whatever to do with the cause of discomfort, for this simple reason—carbonic acid cannot get into the body. The respiration is so controlled by the breathing centre that the excess of carbonic acid (in the atmosphere) cannot enter into the body, and the percentage of carbonic acid in the lungs is always kept the same. It is the percentage in the lungs which controls breathing, and if we breathe an atmosphere containing, say, 1 per cent. of carbonic acid, the only result of breathing that atmosphere is that we breathe a little more deeply. We ventilate our lungs a little more in order to keep the normal percentage of carbonic acid in the lungs, and the excess of carbonic acid can never get into the body, and can never act as a poison; so that we can dismiss carbonic acid altogether. All that carbonic acid can do is to increase the breathing. If there is 2 per cent of carbonic acid in the inspired air, it will increase the breathing by about 50 per cent; this is only what happens when we take a little exercise—we produce a little more carbonic acid in our body, and we increase our breathing by 50 per cent, and we do not feel it. If we are walking we do not notice that the breathing has

increased; nobody would notice an increase of 50 per cent. If I put you into an atmosphere containing 2 per cent of carbonic acid, not one of you would be aware of the fact: there would be no discomfort. That I have proved, and others have proved, by confining a man in a chamber and having a bag containing carbonic acid gas secretly emptied into the chamber so as to raise the constituent CO_2 in the chamber to 2 per cent or 3 per cent. No one in the chamber knows when the carbonic acid is introduced, or has the least evidence of it having been done. If we raise the carbonic acid percentage to 3 per cent, we should increase the breathing by about 100 per cent; if we raise it to 4 per cent we should increase the breathing by about 200 per cent; to 5 per cent by about 300 per cent, and to 6 per cent by about 500 per cent. To increase your breathing by five times means, of course, that you are then breathing in the same kind of way that you would be breathing on taking fairly severe exercise. Of course, the breathing goes up naturally. We breathe, let us say, 7 or 8 litres a minute; if we take hard exercise we should be breathing five or six times that amount; if we took excessively hard exercise we should be breathing ten times that amount. Supposing there is 3 per cent of carbonic acid in the air already, we should be breathing twice as much as normally. If we then tried to take severe exercise we should get into trouble, because we should not be able to breathe sufficiently to get rid of the carbonic acid which we were generating in our bodies. As long as we kept quiet we should not be in trouble at all; all we should feel, if anything, would be that we were breathing more deeply. Anybody who was watching us might see that we were breathing more deeply than naturally. Otherwise, carbonic acid has no effect at all. It is not till you get to 6 per cent, which is the normal percentage in the lungs—it is always kept at about 6 per per cent—it is not till you rise above that, that you feel serious trouble. If carbonic acid accumulates in the body it begins to act as a poison by increasing the acidity of the blood, but it is a very slow poison even then.

We can therefore dismiss carbonic acid as having anything whatever to do with the question. The excess of carbonic acid in the air in a crowded room, if anything, will only make people breathe a little more deeply and make them ventilate their lungs more fully. If you want to make people breathe deeply, there is no easier way than to let them breathe an excess of carbonic acid. To make them expand their lungs, give them a tube to breathe through. Take a broad india-rubber tube a foot long. That will

make them breathe a little deeper. If you put another foot on that, you will make them breathe still more deeply; another foot, and they will breathe more deeply still. You can adjust the pulmonary ventilation to what you like by extending the length of the tube and giving oxygen. That is a method of making people breathe more deeply which is useful from a clinical point of view.

Diminution of Oxygen.

As to the question of the oxygen in the atmosphere, there again the oxygen in a crowded room is never diminished by more than 1 per cent. The cracks and crannies in a room are always such as to let the outside air in. The diminution of 1 per cent of oxygen has no physiological effect whatever. That is shown by the fact that when you go up an altitude, as in the Alps, where there are health resorts 5,000 ft. high, you will find a diminished partial pressure or concentration of oxygen in the atmosphere. At all those famous health resorts there is less oxygen by weight in a litre of air, considerably less oxygen than in the most crowded room. We know that people live in the Andes at heights of 10,000 to 12,000 ft., and even 15,000 ft. up. While the normal partial pressure of oxygen in the atmosphere is 21 per cent of an atmosphere, in the alveoli of the lungs it is normally 13 or 14 per cent of an atmosphere. We can go up to such an altitude that the partial pressure of oxygen in the atmosphere drops down to 13 or 14 per cent without noticing it, at any rate as long as we are resting; if we took hard exercise we would notice it. People get a little mountain-sick from want of oxygen when they first go up to these altitudes, but they soon get accustomed to it unless they have heart disease or there is some failure of the normal mechanism of the body. Changes take place in the blood, in the amount of hæmoglobin and the affinity of hæmoglobin for oxygen, which adapt the body to the lessened oxygen pressure. The body sets its own rate of metabolism, and so long as it gets enough oxygen to satisfy its needs it is uninfluenced by the concentration of oxygen in the atmosphere. These considerations show conclusively that oxygen has nothing to do with the question.

Therefore the chemical state of the atmosphere, so far as regards carbonic acid and so far as regards oxygen, has nothing whatever to do with the discomfort which is felt in crowded and confined places, and it has nothing whatever to do with the success which results from open-air treatment.

The Supposed Existence of Organic Poisons in Expired Air.

We now come to the supposed existence of organic poisons in expired air. A great deal is made out of that. It has got into all the popular books on hygiene; but when we come to examine that question we find that there is no evidence worth anything at all as to the existence of this organic poison in expired air.

Negative Results of Experiments.

The evidence was first brought forward by Brown-Séquard and d'Arsonval, and what they did was this. They expired through a vessel surrounded with ice, and the water exhaled in the breath was condensed. They took that condensation water and injected it into animals. They said the animals were poisoned by it; therefore, they said, there was poison in this condensation water which was exhaled. That was one of their experiments. Another of their experiments was to put a number of animals in glass vessels and draw the air from vessel to vessel, so that animal No. 6 was breathing the air which had come through the other five vessels where the other five animals were. They said that Nos. 6 and 5 got poisoned, while Nos. 1 and 2 remained in perfect health. Those were the kinds of experiment that were brought forward. Well, now, a great number of very trustworthy and skilled investigators have now repeated those experiments, and they have found no evidence in favour of the existence of these poisons. All the evidence of the men we can trust best is wholly negative. To take the second kind of experiment, it has been shown that why these animals died in the last boxes, Nos. 5 and 6, was because errors were made in experimenting; the tubes were wrongly placed, and leaked so that the current of air did not come through at all and the animals were merely asphyxiated from want of air; or else the current of air was made so slow that the last animals were given something like 15 per cent of carbonic acid to breathe—a poisonous amount. Errors of that kind were made.

I have tackled this question in such a simple way that there is no question about it at all. I do not have a number of chambers and tubes leading through from animal to animal. What Dr. Martin Flack and I do in our laboratory is to take a number of deep boxes and put a number of guinea-pigs and rats at the bottom of those boxes and have the lids shut down to such an extent that day and night there is more than 1 per cent of carbonic acid in those

boxes. There the animals live every day; they are thoroughly cleaned and well fed, and they live at the bottom of those boxes, breathing in the exhalation of their own breath day after day, and the ventilation is so arranged, as I said, that at least 1 per cent of carbonic acid (produced by themselves) is in the boxes. These animals do not suffer; they live week after week. We have had them in the boxes for months. They beget young under those conditions. We have to remove them when pregnant to other boxes, because the conditions are not favourable to maternity in a crowded and confined space like that. We put in young ones, and under those conditions there is no sign of poisoning; the animals live and grow. We have also a number of control boxes, containing guinea-pigs, perfectly ventilated. In the cool weather—there were some frosty days—the ones that were living in the closed boxes were warmer in the bottom of their boxes and put on more weight than those living in well-ventilated surroundings. I do not say they are hardier; the others may be hardier, if we could test it, but, at any rate, there is no sign of poisoning at all.

As to the condensation water, the experiments which have been done are really too absurd. You would hardly credit how absurd these experiments are. The condensation of water is obtained by making the man breathe through a vessel surrounded by ice perhaps for eight or nine hours. One gramme of that condensation water has been injected into a mouse weighing 13 grm. This is equivalent to injecting 5 kilo of water into a man weighing 65 kilo. Five kilogrammes of water equals 5 litres of water, and there is $1\frac{3}{4}$ pints in every litre. What man is going to stand having 5 litres of water put into him suddenly, perhaps not even warmed? It is a most ridiculous experiment. And yet the mouse has not died in many cases, but only shown signs of illness, which are supposed to point to poison being in the condensation water. That is the kind of experiment upon which these assertions about the chemical organic poison in exhaled air are based, assertions which have got into all the popular books and been spread all over the world. It is known that water, even distilled water, is toxic. Any distilled water in the laboratory gets infected with bacteria. There are swarms of bacteria that live in a vessel of water on the traces of ammonia and salts that are dissolved out of glass, and the traces of ammonia and dust in the atmosphere. Such water is toxic, and the cause of symptoms of poisoning sometimes observed when salvarsan is injected has been traced by my colleagues, Drs. Fildes and McIntosh, to the use of water contaminated with

bacteria. If you use water that is freshly distilled and contains no bacteria at all, you never get toxic symptoms. Such condensation water experiments as I have mentioned can be dismissed as not worthy of notice. They are too silly for words.

Asserted Presence of Volatile Protein in Exhaled Breath.

Rosenau and Amoss, in America, recently have supported the organic poison theory. They obtained condensation water by breathing for many hours into a vessel surrounded by ice, through a plug of glass wool which acted as a filter, and said the condensation water was pure, and could not be contaminated with saliva, because the plug of glass wool would keep it all back. They injected it into guinea-pigs, and a month later they injected into a vein, or straight into the heart, of those guinea-pigs a trace of human serum. There resulted in these animals anaphylactic shock, and some died. Rosenau and Amoss concluded that human protein was exhaled in a volatile form which passed through the plug of glass wool and was condensed with the water by the ice, and that this volatile protein sensitized the guinea-pigs, and hence the anaphylactic shock when, a month later, they put in the human serum. My criticism in regard to this experiment is that when one breathes for many hours through a plug of glass wool the plug will get wet through with saliva. The expired air will then carry droplets of saliva away from the further side of the plug, and the condensation water will inevitably get contaminated with saliva which contains human protein—viz., mucin. It is that which sensitized the guinea-pigs. The experiment does not prove the existence of a volatile protein (a toxic substance in the exhaled air), as Rosenau and Amoss thought.

Dr. McIntosh and Dr. Martin Flack and I have tried the experiment in what I consider a far simpler, and—if I may say so—more sensible manner. We have taken guinea-pigs and rats, and put them (to live together) at the bottom of those boxes which I have described to you. There they have lived week after week, the guinea-pigs breathing the rats' exhaled air. If there was any protein exhaled in the rats' breath that protein would be breathed in by the guinea-pigs. Rosenau and Amoss assert there is such a volatile protein, and that an inhalation into the lung goes straight into the blood. Of course, we know that a foreign protein which is eaten and taken into the alimentary tract does not sensitize us. We eat beef and yet are not sensitized to ox serum. Rosenau and Amoss go so far as to say that people who live with horses—hostlers,

and so on—may get sensitized by breathing the exhalations of horses, and that is why some are found to be sensitized to a first dose of antidiphtheric serum. I should have thought rather of the hair and epithelial scales which a hostler rubs off a horse—in order to prevent breathing too much of which he makes that peculiar hissing noise. These contain protein and get into the throat and respiratory tract. Well, we have kept the rats and guinea-pigs together at the bottom of the boxes for weeks and weeks, and at the end of the time we have injected into the guinea-pigs' veins a trace of the rats' serum, with no result at all. Not a single guinea-pig has been made ill to the slightest degree. A month later we put into those same guinea-pigs another trace of rat serum. The first trace sensitized them, and every single guinea-pig that got the second trace rolled over dead. How sensitized they were is shown by the fact that in one case we put the syringe into the ear and missed the vein; we squeezed the syringe the least little bit, and a trace of the rat serum went into the tissues of the ear, not into the vein. We pulled out the syringe and prepared to try to get it into the vein for the second time, but the guinea-pig rolled over dead, poisoned by the minute trace that went into the tissue of the ear. That shows how tremendously sensitive to anaphylactic shock are guinea-pigs which have received an injection of rat serum. Our experiments show that there is no volatile protein exhaled in the breath at all. Rosenau and Amoss' claims are entirely devoid of support.

Bad Smells: the Influence of the Imagination.

From what I have said, then, we may dismiss the chemical organic poison theory. The ill-effects of a confined atmosphere are not due to excess of carbonic acid nor to want of oxygen; and there is no organic poison in exhaled breath. Of course, we get other exhalations besides the breath in crowded rooms—exhalations from the skin, exhalations from the alimentary canal, and so on. So do the guinea-pigs that live in the bottoms of our boxes, and live in health and grow and breed. All these small animals live crowded together in their sleeping places. So long as the atmosphere is not too warm, rats prefer to sleep in a chamber that has got 3 to 4 per cent of carbonic acid in it. They will sleep there rather than go out into the cold; but if we put in some wet bread and raise the temperature inside, the rats will come outside—they do not like it. They do not like a high wet temperature. That will bring them out. They do not mind 3 or

4 per cent of carbonic acid a bit. They are quite comfortable in that. These animals when they are huddled together in their nests naturally breathe a relatively large percentage of carbonic acid. They naturally breathe air containing less oxygen, and naturally breathe each other's breath. Every one of us naturally breathes his own breath, because when we exhale we leave our air-tubes, the nose and so on, full of exhaled air; at the next inspiration we draw that back again. We are always inhaling about one-third of the air we exhale. All that goes to show that exhaled air is not poisonous. As regards other exhalations from the body, they certainly make the air smell, but to say that the air smells is quite a different thing from saying that it is poisonous. I admit that the air smells. I admit that that smell may have a depressing action on the nervous system, especially of sensitive people and people who think it will do them harm, because the imagination plays a great part and has a tremendous influence upon humanity. I had an excellent example of that only the other day. The secretary of a large institution said the clerks on the third storey were being poisoned by stove fumes that came up into the room. Would I mind coming to have a look to see what I could find out about it? I found there was a stove down below which was heating the boiler—a coke stove. The coke fumes leaked round the hot-water pipes, especially when the clinkers were taken out by the engineer; they found their way into the well of a lift, which terminated in this clerks' room three storeys up; they came out from the top of that well through the cracks in the door, and made their way towards the fireplace, and the clerks sitting between the fireplace and the lift smelt those fumes. The lady clerks told me a tale about how they suffered and felt faint, and all the rest of it; but the man down below who was turning the clinkers out of the stove, what about him? He was breathing, say, fifty times more of these fumes than the lady clerks, and yet he was doing his work and not complaining. The imagination of these lady clerks had led them to exaggerate the effect of these fumes to an extraordinary extent, and, as one can easily see, if they were made so ill by the fumes the man ought to be dead.

People who have to deal with horrible smells—that is, smells which are horrible to us—get quite immune to them, and as to those men who have to deal with these offensive smells, such as sewer men, men in bone manure and soap factories, men in fried fish shops—there is no evidence that their health suffers from the smell. You rapidly lose all sense of a smell if you are obliged to

carry out one of those trades, and very rapidly indeed if you go into a sewer, even if you are not used to it. We will grant that smell puts one off one's appetite and makes one feel depressed, and so on, and therefore that smell should be got rid of; but the way to get rid of smell is not by trying to blow it out by ventilation, but by cleaning the source of it up. Pettenkofer once remarked that if there was a dunghill in a room it was no good trying to blow away the smell by means of ventilation; the right thing to do was to clear out the dunghill. If a room smell, it is because the room is not clean, or the bodies of the people are not clean, or their clothes are not clean, and the right thing to do is to clean up the room and the people in the room.

How does the Atmosphere affect People?

We now come to the question of how the atmosphere does really affect us. We know that we catch catarrhs, &c., by infection, and in the matter of consumption I think there is no doubt Hamburger is right.

Spray Infection.

There is a method of infection which is of the utmost importance, that is, spray infection, which Fluegge brought into prominence by a series of admirable experiments some years ago. The real infection that matters is the infection by the spray of saliva direct from man to man. While we are breathing quietly and normally the expired air is almost sterile. But if we sneeze, or cough, or sing, then the explosive output of the expired air carries away the finest spray of saliva which spreads to an extraordinary distance. I have seen Professor Bulloch place culture plates along a table 10 ft. in length, wash his mouth out with a harmless bacterium which can be easily identified, stand at the end of the table and say a few words, then cover up every culture plate and place them in the incubator; colonies are found in every single culture plate—crowded in the plates near the speaker, and a few colonies in those far away. I must, as I am speaking, I am sorry to say, be disseminating this excessively fine spray of saliva to an extreme distance all over the room, and so is everybody when he coughs, or sneezes, or speaks. If you are speaking close to a man, straight face to face, it is obvious that the spray will give a most massive infection, that the spray of saliva droplets may contain hundreds of bacteria. Supposing the other man was just inhaling with his mouth open, and a person with the

infection is just speaking, some droplets of saliva may be carried straight down his windpipe right down into the lung.

The other day there was a case that came under Professor Bulloch's notice—a man with acute pneumonia, who traced back his infection to a company meeting at which the secretary present had a cold. With streaming eyes and sneezing continually, this secretary appeared to be at the height of an infectious cold. At this same company meeting there was a man who got pneumonia and died. There was another man who caught a cold, which affected his ears, so that his tympanum was opened and the pneumococcus was found. The third man, who came under Professor Bulloch's care, was a typical case of pneumococcic infection. It is quite clear those three men were infected at that meeting by the spray sent out into the air by the secretary, who was expounding the business of the meeting. This spray infection cannot be prevented very easily if people are going to cough and talk and sneeze and go about among the company in crowded rooms with these infectious colds. Any infectious cold may be a pneumococcic cold. There are very many persons who are walking about with hardly any symptoms of disease, but whose saliva is teeming with tubercle bacilli. I remember the case of a young woman in perfect health, apparently. She complained of a little cold, she was hoarse for singing. Could something be done to prevent that hoarseness? Professor Bulloch examined her sputum and found it swarming with tubercle bacteria. This woman was spraying the bacteria into the room whenever she spoke, sang, or coughed. She went about her business and made a complete recovery. The only way we can prevent spray infection is by keeping people isolated in acute infective states, keeping them away, making them stay at home, or by teaching them to sneeze and cough always into a handkerchief, and if they are speaking we can induce them to speak with a newspaper held in front of their mouths, which would catch all the spray quite effectively; or, if we want to protect ourselves against such a person, we could casually hold a paper in front of our mouths without being rude. In that way, by such simple means, I believe that infection from these colds, which cause so much misery and discomfort, might be limited to a large extent. If people could all be trained when they get into a state of acute infection with catarrh of the nose, to cough and sneeze into handkerchiefs and to speak with a newspaper held in front of their mouths, or at least to keep at home if they are not content to do that, that would prevent the spread of these infections.

Influence of Warm Confined Air on Nasal Mucous Membrane.

Dr. Muecke and I have lately been examining the nose to see what happens to the mucous membrane in a warm atmosphere. Of course, it is quite clear that infection occurs in certain states of weather; that colds run round when there is a sudden change to cold moist weather. We wanted to see if there was any reason behind that. When people are away at the seaside or on the mountains, where they are exposed to any weather, rain and wind, and live in the open air, they get no colds. Children who are out on the shore paddling and exposed to weather and wind and all that kind of thing never get any colds. The moment they come back to crowded places and chill autumnal weather they get them in the schools, and these colds run round and everybody catches them. What is the reason for all that? There must be some fairly simple condition which causes that. There is infection in crowded places to begin with. But then, at the seaside in little cottages and lodgings people crowd together in the evenings, and they would infect each other if a cold were going round, but the 'cold' does not go round in those conditions. It is when you get the cold autumnal winds and you begin to shut up the windows and light fires, and start the heating apparatus, and so on, that the 'colds' begin to come back.

This (see coloured plate, fig. 1) is the condition of the nose as seen under normal conditions when a person comes in from cool surroundings, a cool atmosphere, or the outside air. The mucous membrane is shrunk; it is taut. If you touch it with a probe you cannot pit it, it is not congested, and there is very scanty secretion. That (see fig. 2) is the effect of going into a heated chamber where the air is at a temperature of about 80° F. and pretty well saturated with moisture, conditions such as exist in crowded places, meeting-houses, or ballrooms. The mucous membrane of the nose becomes turgid with blood, and it is covered with a very thick secretion, and the tissues are all swollen. You can push the probe into the tissues and depress them, and it does not come out for some little time, showing how boggy it is. The airway is so diminished that if you have got a spur or anything of that kind you cannot breathe through the nose when you get into these hot conditions. That (see fig. 3) is the effect of putting on a fan in the hot room and whirling the same air. The air so whirled by the fan will bring the nose to more like the conditions shown in fig. 1 and lessen the constriction of the air channels. That (fig. 4) is the effect of going

Fig. 1.

Fig. 2.

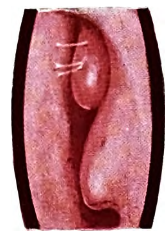

Fig. 3.

Fig. 4.

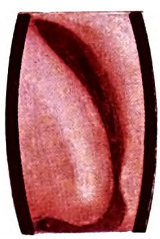

Fig. 5.

Fig. 6.

W. THORNTON SHIELLS.

To illustrate "The Physiology of the Open-Air Treatment."

By Professor Leonard Hill.

out in the open air for a few minutes, the cool open air of last month, of winter—not very cold, but cool open air. The blood goes out as the vessels contract, but one still finds that the mucous membrane is boggy, that it pits, and that there is a great deal of this thick secretion upon it. You see the conditions are such when you go into these hot places that the mucous membrane becomes greatly swollen; there is a great deal of tissue lymph in it, a great deal of thick secretion; the exhaled bacteria that are thrown in masses on it are caught in the thick secretion. Then when you come out into the cold again the blood-vessels shrink up so that heat should not be lost from the body, and you are left with a nose containing thick secretion and a great deal of tissue lymph, a medium for the growth of bacteria, while it loses the blood which defends it from infection; whereas if you never go into a hot room at all you have a nose in good condition, taut, and with a scanty secretion; and the organisms have not got a hold on the mucous membrane, and there is nothing for them to grow in. When the mucous membrane is kept taut and the flow of blood is rapid the inhaled air is warmed up quickly and moisture evaporates from the nose, so as to saturate this air at body temperature; that means more plasma comes out of the blood-vessels, and this contains the immunizing substances. The ciliated cells are well supplied with plasma, and they lash well, and the offensive bacteria are kept out. But when you come back to this condition where you have much secretion and boggy tissue, and the blood has been shrunk out by vaso-constriction, then you have got a suitable nidus for bacteria to grow in.

The Effects of Open and Confined Air upon Metabolism.

I maintain that the whole of the bad influence of confined quarters and the good influence of open air is a question of the heat and moisture of the atmosphere. The evidence that heat and moisture of the atmosphere have a physiological effect, a potent, a tremendous effect, upon the metabolism of the body, is as strong as anything can possibly be. We fail to find any evidence of the toxic effect of exhaled air, but we find any amount of evidence of the most convincing kind to prove that the temperature and moisture of the air have a most profound effect upon the metabolism of the human body.

If the atmosphere is cool and moving it will continually carry heat away from the skin. It will keep the vessels of the skin contracted; the blood will be driven into the viscera, where it will

become metabolized, not drawn into the skin but driven through the viscera and through the brain where it is required. Moreover, the cool moving air acts upon the skin and stimulates the nerves, and the cutaneous nerves have a very great influence upon our comfort. When we get into confined places the air becomes monotonous; it is not moving; we get a monotonous, uniform temperature of the skin; the skin gets hot, flushed with the blood, and the temperature of the skin gets almost the same as the temperature of the body. Instead of being considerably lower than the temperature of the viscera, it gets to almost the same point, and if the room is very hot it gets quite up to that point. The sensory nerves are no longer stimulated because there is no change. If, on the other hand, the air is continually moving, sometimes blowing, sometimes not blowing, it is continually stimulating the nerve endings of the skin and the nervous system generally, and it rouses us to activity, for in order to keep warm we have to use our own body furnace, and that is what we ought to do. We do not want to trust to clothes and fires altogether, because that means we are not using the natural body furnace. We take refuge in these other mechanisms for keeping warm if we do not use our own body furnace. What does that mean? That means that our metabolism is reduced to a low level. That means that we keep quiet and do not have to move. That means that we do not circulate our blood well, because exercise has the most colossal effect upon the circulation. The whole of my researches on the circulation go to show that the duty of the heart is to deliver the blood to the capillary vessels and it is the duty of the muscles to support the arteries and pump the blood back again into the heart, and if the muscles are not doing their work the circulation cannot be efficient. When the muscles are at work the heart beats more quickly, and the blood is carried round the body much more quickly; each minute the whole blood volume is carried round the body many times.

Then when we are taking exercise we breathe more deeply in order to get rid of the carbonic acid, and we take in more oxygen, the blood is more oxygenated, the lungs are better expanded, and this is a most important thing for resisting infection—the expansion and oxygenation of the blood takes place in every part of the lungs. Every part of the lungs is expanded if you take exercise. The ventilation of the lungs may be ten times as great as normal if you take extremely severe exercise—five or six times as much during ordinary hard exercise. That has a most colossal effect upon the

lungs, expanding every part of them, and it has a colossal effect upon the circulation of the blood. And then, as we are using up energy in our muscles, we have to supply that energy, and that means we have to eat more, so that the appetite is excited; we eat more and absorb better. The food that we eat is all absorbed and utilized by the body; it does not go into the great bowel, as a great deal of our food does when we are living sedentary lives. Rejected by the absorbing mechanism because the body does not want it, its fate is to become decomposed by bacteria and turned into fæces and wind and toxic products of bacterial decomposition, which, if absorbed into the blood, may give us all the symptoms of chronic poisoning, such as anæmia and headache. That is all the fruit of sedentary work and living a sedentary life. If you are going to live a sedentary life and keep warm by means of clothes and fires, you knock down your body furnace to such an extent that you want very little food, and the only way to live healthily and not degenerate our tissues by the products of bacterial decomposition thrown out of the large bowel is to live a very simple life and eat sparingly. If you live a sedentary life and eat large meals and drink alcohol, you will get your body into such a condition that its metabolism must go wrong after a certain number of years. Either excessive substances are going to be absorbed into the blood which are not wanted, or you are going to be poisoned by toxic products derived from bacterial decomposition in the great bowel, and then the surgeon comes along and says the drainage system is out of order and he must short-circuit it.

Exposure to wind and cold leads to increased activity on the part of the body and increased metabolism, and it is that which has an effect upon tuberculosis; it is that increased metabolism which is the end we have in view to get more blood circulated, more oxygen breathed in, the lungs better expanded, more food eaten, and if we eat more food we are more likely to get those building stones which are found in food, some of which are exceedingly rare substances, like the vitamines, which are found in outer husks of wheat and rice berries, but are not found in white bread or polished rice. These are the kind of things which are absolutely necessary to the growth of the body, these vitamines. If we do not eat enough food to get sufficient of them, then the metabolism of the body suffers. Therefore it is wise to use our body mechanism so as to be able to eat enough food to get all the building stones required to nourish our frames and produce all the secretions of the body that are necessary for its metabolism.

Increase of Tuberculosis in Confined Spaces.

That is the effect of open air and the way it acts. To show that confinement acts in spreading tuberculosis in two ways there is the evidence communicated to me by Dr. A. W. Wakefield coming from Labrador and Newfoundland, where the fishermen live in little shanties and the atmosphere is perfectly pure—e.g., along Hudson Bay. They live in little shanties heated by American stoves, and they shut themselves up and keep the temperature at something like 80° F. The women and children there hardly ever put their noses outside the door during the winter; the men just go out to fish. They live on white bread and molasses, and tea, which they brew in the pot by adding a little more to the leaves that are already in, and do not empty the pot till the leaves come out of the top and they cannot get water in. They only have in addition a little fish sometimes, and that they eat boiled and throw away the water, and so they do not get the vitamines I have been talking about. These shanties are so small that Dr. Wakefield, when he was travelling, found there was hardly room for a visitor to sleep with the family on the floor. That shows how small these shanties are. The water ran down the walls and the windows were covered with moisture, and if there was a case of tuberculosis the patient would spit all round and the others know nothing about the danger of infection. These fishermen, whether suffering from tuberculosis or not, would spit anywhere till the spittle dropped down the window frames of the shanty, absolutely indifferent to what happened. Such conditions as those, of course, are just what would spread infection among the unfortunate children. We have got all the conditions for massive infection there, with a confined and hot atmosphere, which limits the metabolism, the ventilation of the lungs, the intake of oxygen, the circulation of the blood through the lungs; everything leads to or is in favour of infection, because the immunity depends upon the blood and the serum which passes into the tissues, and the lungs, if not ventilated properly, do not get enough oxygenated blood in all their parts. Investigating the oxygen content of the blood taken from the median vein, J. F. Twort and I have found it increased 5-10 per cent by deep breathing, and this proved that in parts of the lung during quiet respiration the blood is not oxygenated.

From Lofoten, in Norway, I have had evidence sent me through the medical officer in Tromso. He says that at Lofoten in 1907 the cases of tuberculosis among the fisherfolk were in the proportion

of 5 males and 6 females; in 1908, 5 males and 5 females; in 1909, 7 males and 5 females; in 1910, 9 males and 7 females; in 1911, 14 males and 4 females. There is a striking increase in the proportion of males who are infected, going up from 5 to 14; while the females vary between 4 and 7. This he puts down to the fact that the fishermen in Lofoten have given up their old open boats. They used to fish in open boats during the spring and summer ever since the time of the Vikings, and lived in draughty shanties and walked about the shore. They have given them up and taken to motor-boats. They live in these small motor-boats—day and night, six or eight men—and fish nearly all the year round and sleep in the cabin heated by the motor, where they sit and smoke and eat, as well as sleep, living in a confined space which is built of iron, so that no ventilation can take place through the walls of it. That is the cause of the increase of the disease amongst the men. Directly you get these confined spaces with American stoves or motors to heat them, then you have the conditions which spread the infection. That is my contention.

Ventilation in Ships.

In our battleships, of course, we have got exactly those conditions. The Local Government Board insist that a pauper should have 1,000 cubic feet of space allotted to him in a dormitory. In our *Dreadnoughts* 80 cubic feet is the space for each sailor, and in some cases it is even lower than 80. A battleship is not a brick building. In a brick building a great deal of ventilation takes place through the walls and windows and doors, even if it is shut up, but a battleship is a steel structure, and no ventilation of that kind can take place at all. Therefore, it is absolutely necessary to have artificial ventilation. In these battleships they have air-trunks which convey the air driven in by fans. The louvres open in the ceiling, but the men, when they feel the cold air blowing on them, can very easily put their hands out and shut them up. The British sailor does not like cold air, and he pushes out his hand and shuts the ventilator up near his hammock. I have seen the louvres sealed up with canvas and painted over in a super-Dreadnought. Here again the conditions which matter are the moisture and the heat of the air. In many places in these battleships you will find a wet bulb temperature of from 80° to 90° F. To be under those conditions depresses the vitality of the body, and if there is a tuberculous subject there the spray of his saliva will be carried from him

to others. The saliva spray will not be cooled down, and the tubercle bacilli may preserve their vitality undiminished in the warm atmosphere. The right thing to do under all these conditions is to bring in fresh air through hose-pipes, and have extraction fans working, and so on, in order to keep the air cool and moving in every possible way.

Recently Mr. James Keith, of Messrs. Keith, Blackman and Co., told me some facts about the *Lusitania*. In the *Lusitania* engine-room, working at full steam, the temperature used to reach 150° F. It is distressing for the men to work in that temperature; it strains the heat-regulating mechanism of the body, and some of the energy which ought to go to external work is used to keep the temperature down. The blood is sent to the skin and the heart has to exert its power in order to drive the blood to the skin and cool the body instead of sending it to the muscles and viscera where it is wanted; so the health of the men is depressed. Mr. Keith has put a big air-trunk in, 5 or 6 ft. in diameter, which goes straight down from the deck, and at the bottom of that trunk he has put a 5-ft. fan, which pulls in the outside air, not warmed in any way, and to such an extent that it pulls in 6,000,000 cubic feet of air an hour. The result of that is that the temperature is brought down from 150° to 70° F., and no draught is felt at all. So long as it is as warm as that no draught is felt, and the comfort to the men and the effect on their health, I am quite sure, will be extraordinarily good.

Ideal Conditions.

In all our rooms we want to have the air moving—I do not say to make an unpleasant draught, but to have the air gently moving. The ideal conditions are radiant heat, such as you get on a spring day when the sun is shining and there is frost in the air and a gentle breeze, with a warm sun. Those are the ideal conditions. In our rooms we want to get radiant heat. We never want to heat the air if we can help it. In heating a room let us heat it to the lowest degree compatible with comfort. Try to heat it by radiant heat and keep the air moving.

Demonstration of Importance of Moving Air.

The thermometer is not an instrument which tells us what the body feels. Suppose I put eight students packed like sardines in my little experimental chamber (it contains 3 cubic metres), seal

them up air-tight, and by their own body heat let them raise the temperature to 85° F. and saturate the atmosphere with their own moisture. Let them stay till the carbonic acid rises to 4 per cent, and the oxygen diminished below 17 per cent, so that they cannot light a cigarette. They will try and try in vain, and think there is something wrong with their matches, and borrow matches from somebody else. They do not feel any want of oxygen, and so do not know why they cannot light a match. They get uncomfortable, hot, flushed, and wet with perspiration, and cease laughing and talking. I have got in the chamber a powerful fan. I put that on and stir the air, and everybody is perfectly comfortable, and they all begin laughing and chaffing. It is just the same old air with 4 per cent of carbonic acid in, but the air at 85° F. is thoroughly stirred, and the fan blows away the stagnant air in their clothes which is heated up to the body temperature and saturated with vapour; it blows that out and brings the air at 85° F. in contact with their body. Instead of having stagnant air at 99° F., they have air at 85° F. blowing round their body; that cools them and makes them feel all right. That experiment shows that it is the body-heat stagnation which is troubling them.

Suppose the thermometer in the chamber registers 85° F. wet bulb and 86° F. dry, and the fan is on. Switch the fan off; the thermometer still says 85°-86° F., although you feel thoroughly miserable when the fan stops. You put the fan on and you feel perfectly comfortable, but still the thermometer says 85°-86° F. That shows how the thermometer fails to demonstrate the conditions which we feel. It is no use for people to trust to the ordinary thermometer, neither wet nor dry, because it does not show heat loss. It only shows the temperature of the room, the average temperature of the furniture and surroundings and walls; it does not show us the heat loss of the body.

The Kata-Thermometer[1] or Comfort Meter: An Apparatus for showing Rate of Heat Loss.

I have instruments here which I have contrived for showing the rate of heat loss, and I believe these will prove to be of general utility. I have two large bulbed spirit thermometers. The bulb of one is covered with muslin. The stems are marked at 110°, 100°,

[1] The kata-thermometers are made by Mr. J. Hicks, 8, Hatton Garden, E.C.

and 90° F. I warm the bulbs to 110° F. in warm water, then take them out and dry one, and jerk the excess of water off the other. I let them cool and take the time occupied by the menisci in falling from 100° to 90° F. The wet bulb loses heat by evaporation and the dry by radiation and convection. On an ideal spring day the wet took 45 seconds and the dry 2 minutes 20 seconds. In a room with closed window and door, and heated up to 70° F. by an anthracite stove, they took about 1 minute 30 seconds and 5 minutes. Well, the conditions must be altered there, so that they fall in times approximating to those of the ideal spring day. The ventilating and heating should be arranged so that the instruments fall from 100° to 90° F. in about 45 seconds to 1 minute and 2 minutes 30 seconds to 3 minutes, and then comfort and healthy conditions will be obtained, particularly if the source of heat is a radiant one—an open fire or modern gas fire.

Effects of Cold Moving Air on Temperature of Skin and Metabolism.

Another thing I would like to tell you is, I have got a little wet and dry thermometer here which I can carry this way. I slip it down my shirt like this, between the skin and the shirt. I have been taking a number of observations with this on wintry days. I am accustomed to getting up at 6.30 in the morning and taking a cycle ride up to a fine bathing pool in Epping Forest; I have a dip in this water and out again, and cycle back to breakfast. I have kept that up with few days off this winter. Once or twice I had to get into an ice-hole. Riding up to this pool I have been observing what happened to the skin-shirt temperature. Ordinarily, sitting in front of a drawing-room fire one's skin-shirt temperature is about 32° C.—dry 32° C., wet 30° C. (I am afraid I must give you figures Centigrade.) The body temperature is about 37° C. Riding home after my bath in the face of a cold wind the temperatures are far lower. Once they were 14° and 11° C.; another time 16° and 14° C. After my bath I am cooler than I am when riding to the bath, because the bath constricts the vessels of the skin. These temperature readings show you what a colossal effect cold moving air has in cooling the skin. Instead of being 32° C., as it is in front of a fire, if you go out in a wind in a motor-car or on a bicycle with the wind going through you, you have skin-shirt temperatures of more like 16° and 14° C. This has a great effect in driving the blood into the body, stimulating activity and increasing metabolism.

Conclusion.

To sum up. I am convinced that the whole of the effect of open-air treatment is due to the movement, temperature and moisture of the air, and has nothing to do with its chemical properties. Conformity to a better mode of life will enormously increase the health and happiness of everybody. Modern life is tending to put people into confined places, heated by convectors, with perfectly made windows, no draughts, and that kind of thing, and it is diminishing the metabolism, and vigour, health and happiness of everybody, quite apart from causing consumption. Man cannot go straight into these artificial conditions when he has been for a million years living an out-door life, facing every element, wind, cold, and rain. He cannot do that. What we have got to do is to compromise and arrange matters so that we may get open-air exercise and exposure to wind and weather. Do not let us put up these great skyscrapers, or have these artificial cellars for people to live in, but let us have facilities for open air, and playing fields, and exercises of the body, and then we shall enormously increase the happiness of the people.

United Services Medical Society.

GUN-RUNNING OPERATIONS IN THE PERSIAN GULF IN 1909 AND 1910.—WITH A CONSIDERATION OF THE WOUNDS AND DISEASES CONSEQUENT THEREON.

By Fleet-Surgeon K. C. MUNDAY, R.N.

For some years past a brisk trade in arms and ammunition had been carried on between Afghans and the warlike hill tribes of the northern frontier of India. From his early boyhood every man of these highland races has one great ambition, and that is to possess a rifle and ammunition and with it learn to shoot men and beasts with deadly accuracy. For the attainment of this object he will give all the money he possesses or cheerfully risk his life in hazardous raids on British outposts. From his rifle he derives his food, his clothing, and his sport; with it he decides the issue of his personal and family quarrels and the feuds of his tribe. The Afghans used to form small syndicates and purchase arms in the bazaars of Mascat on the Arabian side of the mouth of the Gulf, and so far the trade was legitimate, but the Afghan syndicates would subsequently ship the purchased arms on board sailing dhows and convey them across the Gulf to obscure landing places, chiefly on the Mahran coast on the Persian side. Here the cargo would be landed and stored in depots situated from six to twenty miles inland, whence the guns and ammunition were conveyed across Persia to Afghanistan and Northern India, as soon as sufficient transport and escort was collected. The Governments of India and Persia became anxious for many reasons to prevent this indiscriminate importation of arms, and measures were taken to suppress the traffic, the work of this falling upon the Navy in conjunction with an Indian military force. A blockade was established in 1909, and soon resulted in many captures of dhows laden with arms and ammunition. This blockade was necessarily carried out under circumstances of great hardship and privation. Early in 1910 native troops from India arrived as reinforcements, and were, with a Naval party, landed on January 25, near Jashk. No tents were taken by this force, clothing was on a summer scale, two months' sea rations and one month's field service rations for the

force were sent with it. Field service rations were packed in 40-lb. loads.

Drinking water transport consisted of: Ninety-four water tanks for mule carriage, holding eight gallons each, and 1,394 one-gallon canvas "chaguls." This allowed one to every man and every follower, and one spare to each. In practice, it was found that these canvas "chaguls" oozed water very freely for the first forty-eight hours and so made the men wet and cold. Subsequently, therefore, we filled and hung them up for forty-eight hours in order to let the canvas swell. There was then considerably less oozing, but even a slight dampness allows of rapid evaporation and makes the "chagul" unpleasantly cold. This constitutes a grave objection to an otherwise admirable method of transport of drinking water over country which is destitute of water of any kind. I should be glad to hear from officers present whether they have experienced the same difficulty, and how it was circumvented.

On the 26th this force met with opposition, and an action was fought, resulting in the capture of many rifles and large supplies of ammunition.

The force halted for the night, and then proceeded to the coast in two marches of 16 and 17 miles and at once re-embarked. There were no sick among the combined force, nor did any man fall out, in spite of having marched 53 miles in fifty-four hours over very heavy ground, mostly loose sand, with here and there rocky patches. One bluejacket lost his boots in the bivouac at the captured depot, and marched 15 miles in his socks without getting sore feet. His bitter indignation when ordered into a dhooly was expressed in terms too forcible to be repeated here. All the sailors, except this man, came back with blistered feet, but none subsequently incurred any bad effects from their trying experience. They had all been subjected to careful medical examination and selection, and their feet had been hardened, first by vigorous washing with soap and water, and then by soaking in Condy's fluid for an hour every evening for three days. The uppers of their boots were softened with neat's-foot oil, and they started with clean socks, the insides of which had been well soaped. Each man carried two water-bottles of distilled water, and when these were exhausted they were refilled by water filtered from a running stream through two germ-proof field filters, which were found to be most efficient. Every man was strictly forbidden to touch any water that had not been filtered, and although some of the native troops drank straight from the stream, the bluejackets did not follow their example. Each man

was furnished with a first field dressing, which he was made to sew on to his jumper. The column was attended by field stretchers and dhoolies. The former were meant to convey wounded merely from the fighting line to the first dressing station, and were manned by bearers told off from the troops themselves. It was intended that the dhoolies should transport patients from the dressing station to the field hospital, and thence to the landing place. Each was manned by six men, four of whom actually carried it, the other two being reliefs. The dhoolie consists of a stout pole, generally bamboo, 14 ft. long, and supported by thin bamboo cross legs at either end, and a light cot formed of a bamboo frame covered with canvas, slung from the pole, from which are hung waterproof curtains reaching to the edges of the cot. To carry a dhoolie satisfactorily requires much practice. The bearers in this case were quite unaccustomed to their work, since, for the previous two or three years, a two-wheeled ambulance had taken the place of a dhoolie in station hospitals in India, and seventy per cent. of the dhoolie bearers were thrown out of employment and disappeared, the remainder becoming wheelers of ambulances. In this march over rough and precipitous ground, dhoolies were the only possible means of transport for the sick and wounded. Four men carrying the dhoolie empty became quite exhausted after a very short distance had been covered. And when 100 lb. weight was put into it the bearers collapsed. When the use of dhoolies is contemplated it would seem a most important provision that trained bearers should be secured, otherwise they may prove disappointing encumbrances. Carried by trained men, it is to my mind more comfortable and efficient than any other method of transport of sick or wounded over rough or mountainous country.

On February 2, I went on board the "Hardinge" and saw the Indian Field Hospital, their drugs, instruments, apparatus and dressings, together with the various above-mentioned methods of carrying water on the march. Of these, the eight-gallon water tanks, carried pannier fashion, one on either flank of a mule, seemed most excellent in every way for mountain warfare or operations over ground too rough for wheeled transport, which would, of course, be a more economical method of conveyance where roads were available. These tanks are shaped to fit a mule's back, and are covered with felt. They are, in fact, glorified Service water bottles, made of galvanized iron, or in some cases of aluminium, a pair of them carrying 17 gallons, making one mule load.

Another means of drinking-water transport, namely, the goat

skin "mashk," carried by the bheestie, an old and well-tried comrade of British and Indian soldiers on the march, was to be seen in large numbers. Where wheeled transport cannot be used perhaps this method is in some respects the best, and certainly for supplying the firing line during a lull in a long action it must be quite unequalled.

On February 20, a mixed Naval and Military force again landed, but on this occasion no opposition was encountered or arms found. The force re-embarked in the evening. The total distance marched was 16 miles. Eight hours before landing all the men soaked their feet in Condy's fluid and anointed the insides of their socks with a thin layer of boracic ointment. No man had on his return the slightest sign of sore feet, although after marching the first ten miles on the previous expedition all the men, except one, had developed blistered feet, in spite of the fact that their socks were carefully soaped beforehand. None of the men in this second expedition had taken part in the first or had any opportunity of landing since January 21, or even of wearing their boots on board. No further incident of importance took place until the landing at Lingah, in October, of a Naval force from H.M. ships "Fox" and "Odin," Staff-Surgeon John Martin and Surgeon Drennan being the medical officers. Lingah is a prosperous but unprotected Persian town, which was at the time threatened by marauding bands exasperated by the interference in their gun-running pursuits. The population of Lingah, consisting of Persians, Baluchis, Indians, Arabs, and a handful of Europeans, numbers from eighty to ninety thousand. The streets are narrow and unpaved. There is no method for disposal of sewage, and it is almost impossible to walk about the open spaces of the town without stepping in human excrement. Drinking water is derived from tanks supplied through roughly cut canals or watercourses leading from a catchment area in the hills at the back of the town. These canals, far from being protected from pollution, actually perform such subsidiary functions as latrines and refuse gullies. The householder's method of disposal of his waste water usually consists of knocking a hole in the wall near the ground and allowing the water to run through. So long as it is outside his house he cares not what becomes of it or what its effects may be. Very often where there was no fall it collected in a stagnant, stinking pool, which afforded excellent breeding ground for mosquitoes. The force from the "Fox" was lodged in three Arab houses vacated for the purpose by their owners. These buildings were on the outskirts of the town, and directly overlooked

the desert surrounding it. They became known as the Upper, Lower and Main Guard respectively. Each consisted of two or three rooms opening on to a compound, with walls some 9 ft. in height. The compound of the main guard was larger than the others, and in this was erected a large marquee with red lining and side curtains of similar material. A date-leaf shelter with side curtains was rigged in another corner. These, with the rooms in the house, provided ample accommodation for the number of officers and men (69) lodged here. There was also quite sufficient space in the other two houses for the number of officers and men told off to man them, viz.: Upper guard: 3 officers, 16 men, and 10 sepoys from the British Consular guard; lower guard: 17 petty officers and men. The Main guard stood on a slight elevation overlooking the bed of the river, which was quite dry. To the north-east and distant 60 or 70 yards, in the dry bed of the river, were a dozen or more wells, from which the washing water was drawn, and where at all times of the day the native women came to draw water. These wells are fairly deep and not very likely to harbour mosquito larvæ. To the south-east and south were four "bourkahs" or tanks for the storage of drinking water. These tanks, of which there are a great number in and about Lingah, are circular, about 18 to 20 ft. deep, with vertical sides, and covered with high conical roofs of baked clay. At opposite ends of a diameter 20 ft. long are porches, which serve respectively to receive and supply the water. Many of these tanks were absolutely dry, with cracked clay bottoms when the "Fox's" force was on shore, as the dry season was then nearing its close. Some, however, contained a few inches of water, and in these mosquito larvæ abounded.

A little to the south-west of the Lower guard and distant 500 or 600 yards were eight or nine "bourkahs," of which two contained a few inches of filthy stagnant water. The Upper guard had a well in the compound, and the overflow from this accumulated outside the wall until it was opened out shortly after the occupation and allowed to run away freely. The floors of the houses utilized for the force were simply dried clay or mud, and very dusty, harbouring sand flies and other voracious insects, which, with the mosquitoes, at night rendered sleep difficult, and covered the men's skins with bites.

Staff-Surgeon Martin alone took the precaution to provide himself with a mosquito net, and to this he ascribes his immunity from malaria.

For the first two or three days time was fully occupied in

the construction of latrines, shelters and advanced sangars. After this, short route marches in the early morning were carried out, and the men spent the heat of the day (10 to 4) in the shade.

Lime juice was issued daily, and rum each evening. From November 2, inclusive a quinine parade was held each day at 5 p.m., and every officer and man took quinine bisulphate 5 gr., with 5 gr. extra on Sunday. For a few days all went well, and the health of the force was excellent, but on November 1 the party living in the Upper guard began to form a sick list. The lieutenant in charge, who had been three years on the station, and had previously suffered from malaria, was the first case, and he was quickly followed by an able seaman. The next day three men were attacked, and on the fourth and fifth five men and one sepoy.

It should here be explained that the Consular guard, consisting of nine sepoys and one native corporal, were lodged in a room of the Upper guard, and, being Hindoos of high caste, were not interfered with in any way, special precautions being taken to avoid any offence against their religious prejudices.

On November 5, another man from this house was taken ill, and also a stoker P.O. from the Main guard. On November 6, two more sepoys went down with fever. Each patient was sent off to the ship, either in the early morning or late afternoon of the day on which illness commenced.

Seven out of the total of ten sepoys were attacked; but all recovered in two or three days. During the occupation of the town, altogether fifteen men out of a total of nineteen in the Upper guard were attacked, as against six from the Main guard and two from the Lower guard.

Cases continued to occur every day in spite of the quinine every man was taking. On November 7, all the white men were removed from the Upper guard and only manned the roof at night; but the sepoys were left there, and, as noted above, seven out of ten went down.

The after-history of this outbreak of fever is as follows: The "Fox" went to sea on November 15, and resumed her station on the blockade. Cases occurred steadily day by day after the return on board, and now men who had been lodged in the Main guard and Lower guard began to go down.

Some of those also who had had one attack in the early part of the month now had second attacks. Most of these recovered in a few days under quinine. Two men who had not landed at all were attacked, the first on November 16, and the second on December 1. Three had a second relapse, or third attack.

That the sepoys were the means of originating the infection seems more than probable, as nearly every native of India of that class is saturated with malaria, and the disease furnishes an enormous proportion of the sick list of the Indian army.

The manner in which the "Odin's" party was affected differs somewhat from the above.

The "Odin" landed seventy-five officers and men on October 28, and re-embarked them on November 10. Their quarters by day were commodious, fairly elevated, and a good distance from the native huts. During the night they slept in the open sangars or trenches on the outskirts of the town. Every officer and man had five grains of quinine every evening whilst ashore. All enjoyed excellent health during their occupation of the town, and looked like men returning from a health resort when they re-embarked on November 10. Between this date and November 23 there were fifteen cases of malaria, two officers and eleven men being attacked. Between December 4, and December 8, there were three second attacks.

The next incident in the blockade which is worthy of note is the landing at Ras Bris, on the Mahran coast, on November 2, of a party of bluejackets from the "Proserpine" under the command of Commander Marshall.

There was reason to believe that arms had been landed and concealed in the vicinity, and whilst search was being made the party was sniped at by riflemen well concealed in the adjacent scrub. Commander Marshall received a bullet wound on the left leg, the missile evidently entering on the outer side and passing obliquely downwards and inwards. The tibia was fractured transversely. Severe hæmorrhage was controlled by plugging and a tourniquet. The patient was then taken on board his ship and the limb was put up on a Macintyre's splint for four days, this being afterwards replaced by a box splint. Ecchymosis and great swelling extended from the groin to the ankle. The wounds, however, healed without suppuration. Massage was commenced on the 13th day. After seven weeks' treatment on board the ship, the patient returned to full duty.

His messenger boy, who was standing close to him, was shot at the same time, first through the right calf, and then while lying on the ground through the left side of the neck, the bullet entering below the ear, and emerging in the middle line at the back of the neck. The wounds had to be plugged to arrest profuse hæmorrhage; but they healed without suppuration, and the boy returned to duty on the twenty-eighth day with no evident disability.

A military officer of the Intelligence Department marching with the captain was wounded in the lower abdomen; he also received first-aid and was taken on board the "Proserpine." No sign of perforation of a viscus was observed, and the wounds healed by first intention.

The remainder of the party under the First Lieutenant advanced rapidly for several miles inland, searching for the snipers and for the hidden arms and ammunition, but met with no success. The following day, however, 370 rifles were discovered buried in the sand. On December 23, H.M.S. "Hyacinth" arrived at Debai, a town the inhabitants of which had formerly a great reputation for piracy, and latterly had been suspected of participating in the arms traffic, and information having been received that stores of smuggled arms were in the place, it was decided to search several houses. That night, therefore, preparations were made to land 100 officers and men for this purpose. In the light of subsequent events, it should be explained that similar house-to-house search expeditions had been quite common events during the blockade, and had invariably been accomplished without the slightest resistance, and apparently without any marked resentment on the part of the townsfolk concerned.

Therefore on this occasion also no resistance was anticipated, and all arrangements for medical assistance were declined, except the provision of the customary first-aid equipment. It was explained that, should any need for medical assistance arise, the landing party would all the time be so close to the beach that help could be readily summoned from thence and afforded from the ship. Moreover, the boats were already so heavily laden with military stores, that if the stretchers and a stretcher party were added, some of the boats might get aground on the bar. Lastly, it was confidently, and I think reasonably, expected that so large a party, backed up by the presence in the anchorage of the flagship, whose guns could, in a few hours, have utterly destroyed the crowded and defenceless town, would overawe the inhabitants and banish from their minds any thoughts of armed resistance.

At the same time it was considered that to make all preparations on board just as if fighting were intended, or expected, would be both prudent and instructive.

The carpenter was told to get up all the cots in the ship, eleven in number, and then all the stretchers, nine in number. The cots' frames were rigged with canvas covers, lashings, bed and bedding, including clean linen and blankets, from the carpenter's store. Two

iron swinging cots in the sick bay also were prepared in the same way, the others being unshipped and stowed away, so as to afford more room and air-space. The weather at this time was too cold and too unsettled to permit of patients being treated on the upper deck.

The petty officers' mess on the cable deck, opposite the sick bay in the forecastle, was cleared out, and two cots hung there. The whole cable deck was scrubbed with Izal, and four cots were hung there between two large gun ports. The remaining five cots were hung in the admiral's fore cabin and after cabin, which have a w.c. and bathroom separated from them by a lobby, and which are ventilated and illuminated by two skylights, a large gun-port on either side, twelve small ports, and a door leading on to the stern walk. A fracture bed was also manufactured by screwing trestles on to a small mess table 6 ft. 6 in. by 3 ft. and put up in the admiral's fore cabin. In the meantime 200 swabs of wool covered with cyanide gauze were sterilized, placed in bowls of 1 in 2,000 perchloride lotion, and covered with sterilized towels; all the available towels in the ship, not in use, were commandeered, twenty were sterilized by boiling and wrapped in dry sterilized towels forming ten bundles, each containing two towels. The haversack for landing parties was overhauled and restocked with sterile dressings and fresh solutions of morphia $\frac{1}{4}$ of a grain to 1 dram or syringeful, and strychnine ♏v to 1 dram.

The operating table was scrubbed with Izal and rigged with a new mattress covered with a blanket, sheet, and macintosh sheet. Temporary beds were made up on the cable deck of hammocks covered with mostig battist; and by each of the beds were placed drinking water, soap and washing water in a basin, a towel, and an empty cup for Bovril. The cook was instructed to have Bovril ready in large quantities at fifteen minutes' notice. The value of these preparations was evident when, shortly after the landing party had commenced its search, it encountered armed resistance of a determined kind. Medical help was asked for by the party on shore, and a boat laden with stretchers, dressings and surgical appliances proceeded at once. The shore was reached without any casualties, although the boat was struck more than once. In an entrenchment was the body of a serjeant of Marines who had been killed by a leaden Snider missile, which had entered about the centre of the vertex and emerged about an inch above the nose. There was also a seaman in an almost moribund condition, who was found to have sustained a compound comminuted fracture of

the left side of the lower jaw, a severe wound of the neck, a wound of the right forearm with fracture of the radius, a wound of the left carpus and metacarpus with much comminution of the bones, and another wound of the muscles of the back between the shoulders, all of these being due to bullets. A stimulant was administered, and he was then left with head low and limbs raised on heaps of sand. In the meantime the sick bay steward was despatched with drinking water, which he served out to the remainder of the wounded in this trench, with the exception of one man, whom he reported as wounded in the abdomen. Of these the most urgent case appeared to be a Marine blanched with hæmorrhage proceeding from a gaping ragged wound of exit $1\frac{1}{2}$ in. above the centre of the crest of the left ilium. Slitting up the trousers one found a small wound at the centre of the outer side of the left thigh. The upper third of the femur was comminuted. He had been shot by snipers from the houses on his left rear, while lying down replying to the fire in his front. Hæmorrhage was now controlled by plugging the upper large wound with strips of gauze, morphia was injected, and the limb was roughly immobilized with his rifle and a couple of bayonets. The next case was that of a Marine bleeding profusely from small bullet wounds of the right axilla and shoulder. Here the surgical neck of the humerus was shattered. There was a good deal of shock, but no mental confusion. I mention this, because the scalp over the right parietal eminence was deeply grooved, probably by the same bullet. Morphia and strychnine were injected. The wounds were dressed with pads of cyanide gauze, the hæmorrhage being at once controlled by the pressure of the bandages. A pad was placed in the axilla, and the arm firmly bandaged to the side. The abdominal case was then attended to. On cutting open his shirt I saw the leaden nose of a small-bore sporting bullet protruding from, and tightly grasped by, the lips of a wound in the right hepatic region, just below the costal arch 1 in. from the linea alba. The missile had entered in the right axillary region low down in the middle line. The eighth rib was fractured and respiration was embarrassed by a constant painful cough. Neither morphia nor water was administered to this patient. A pad of gauze was applied to each wound, and the left chest was strapped above, over, and below the fracture. This gave a good deal of relief. The lips of the wound grasped the bullet so tightly that a small incision was afterwards necessary for its extraction.

There remained one more case. He was still firing from the prone position, assured me that he was only grazed across the back, and said he required no assistance at present. Noticing his pallor and seeing that his tunic and shirt were torn and saturated with blood, I slit them up and discovered a gaping, jagged wound 8 in. long and $2\frac{1}{2}$ in. wide running downwards and inwards from the angle of the left scapula. This was the exit wound of a bullet which had entered 1 in. above the spine of the left scapula, and apparently had passed between the scapula and the ribs without injuring either, but had ploughed up the muscles of the back to a serious extent. The large gaping wound had to be plugged to control the hæmorrhage. While the party landed on shore was being attacked, those men who had been left behind as keepers in the boats used for landing, and then lying close to the shore, also found themselves exposed to a heavy rifle fire. On reaching the pinnace I found several large holes on her port side, which was turned almost broadside on to the houses, and some lumps of lead embedded in corresponding holes on the starboard side. The line of fire had evidently been at an acute angle to the boat's side. These lumps of lead were probably Snider bullets. The coxswain was lying dead in the bottom of the boat, with a wound in the pericardium, evidently inflicted by one of them.

One of the pinnace's gun's crew was lying under the gun with two very small wounds on each side of the abdomen, probably inflicted by a small-calibre high-velocity bullet, either Mauser or Lee-Metford. That which I suppose to have been the entrance wound was just below the centre of the crest of the right ilium, and the exit just above and a little anterior to the centre of the left ilium. Both wounds were practically closed. He complained of very little pain. His pulse was 64 and of good tension. First field dressings were applied and secured with a broad calico binder; a comrade was told off to sit by him, keep him perfectly still, and prevent him from eating or drinking.

Another wound, inflicted by the same type of bullet, was that of a young signalman on duty in the pinnace. The entry was immediately below the root of the right zygoma. Taking a downward and backward course the bullet emerged $\frac{1}{4}$ in. to the right of the spine of the seventh cervical vertebra. There was very little hæmorrhage and practically no shock, for with great pluck he stood up and signalled to the ship, until ordered to lie down in the bottom of the boat under cover from the severe cross-

fire. First field dressings were applied. This wound healed by first intention, and the patient soon returned to duty.

The remaining casualty in the pinnace was a bullet wound of the right ankle, remarkable as having no wound of exit. The man was standing up serving the 3-pounder gun when a ·303 bullet first pierced the side of the boat and then entered the right ankle, base first, just below the internal malleolus, grooved that bone, and came to rest on the head and neck of the astragalus. It was afterwards located by X-rays and extracted. At this time there was a good deal of pain; morphia was injected and first field dressings were applied.

Passing on into the first cutter, which was moored astern of the pinnace, I found her coxswain also lying dead by his gun. He had been killed by a bullet which had shattered the whole vault of the skull, small pieces of it being afterwards found in various parts of the boat.

Attention was next drawn to a P.O., who had classed himself as slightly wounded, but was now very blanched and evidently exhausted. He had been firing the Maxim gun from the bows of the second cutter, when he was shot in the upper third of the right forearm, the bullet passing between the bones, apparently without injuring either them or any other important structure. A skiagram afterwards showed what are interpreted as splitting of the ulna and transverse cracking of the radius, without displacement. The bullet, which must have been of small calibre, either Lee-Metford or Mauser, entered on the extensor aspect, about 2 in. below the head of the radius, took an almost horizontal course, and emerged on the flexor aspect, about 1½ in. below the coracoid process of the ulna. The hæmorrhage had been profuse, and was probably increased by the patient's intrepid action. The sights of his own gun having been shot away, and the men firing the 3-pounder in the pinnace having been either killed or wounded, he climbed from the cutter into the pinnace and proceeded to fire the 3-pounder until loss of blood rendered him too faint and exhausted to continue. The hæmorrhage was controlled by direct pressure and elevation of the limb. The wound healed by first intention; but there remained slight numbness of the forefinger, some weakness of the extensor muscles, and of the muscles of the thumb; while there was slight and rapidly decreasing limitation of pronation and supination. The median and ulnar nerves seem to have entirely escaped injury. The function of the radial nerve was only partially and temporarily impaired, probably by the

proximity of the course of the bullet to the nerve. The posterior interosseous nerve would appear to have suffered considerable damage, but evidently was not entirely severed, for although all the extensors except the extensor carpi radialis longior were affected, they were not paralysed. There was no wasting of the muscles of the forearm; but those of the thenar eminence became flabby, although the thumb could be firmly flexed, abducted and adducted. He not long after returned to duty in the ship, and was promoted to C.P.O.

While first aid was being rendered to the wounded, preparations for the withdrawal of the force had been completed. The boats were brought in to the beach and the loaded stretchers were placed on the thwarts of the pinnace, which was towed by the steam cutter. It should be noted that none of the wounds sustained in the boats subsequently suppurated, while all of those inflicted on the men in the entrenchment afterwards became more or less septic. These men were lying in sand, which was very extensively fouled with the excreta of a town of 10,000 inhabitants, the sea beach being a sort of public latrine infested with myriads of flies. Those wounded in the boats also had the advantage of escaping the transport from the beach into the boats, and were hoisted literally straight from the place where they were shot into what was almost tantamount to the wards of a hospital ship. But it is to the fact that the transport from the entrenchment on the beach to the boats was of about only a dozen yards distance, and could be conducted with deliberation and care, that these five cases owe their lives. If they had received such severe wounds some miles inland, and if they had been transported, either by hand in a stretcher or by wheeled vehicles, it is certain that they must have died of the additional shock thus entailed. The rapid improvement in their condition after they had received morphia injections was most noticeable. Without it the passage in the boats back to the ship, in a heavy swell, must have been torture.

As each man was hoisted on board on his stretcher he was laid on the temporary bed arranged for him, to await his turn for the examination of his wound on the operating table in the sick bay, and his eventual disposal.

The men wounded on the 24th at Debai were subsequently transferred from the "Hyacinth" to the Indian Marine ship "Minto" for passage to Bombay, whence they were subsequently conveyed to England.

In conclusion I should like to draw your attention to a form of

pseudo-beriberi very familiar to all who have served in the Persian Gulf. I refer to a disease the only symptom of which is œdema of the legs, varying in degree from a swelling which is barely perceptible to an œdema which urgently demands treatment. No nervous symptoms are associated with it, but it is apparently peculiar to the Gulf and the conditions of life associated with that spot. Officers who suffered from it found that it was very much mitigated, if not banished, by any exercise obtained during the intervals in which leave was given when their ship was being repaired in harbour. Up to the present, as far as I know, the exact etiology of this condition still requires elucidation.

Clinical and other Notes.

A NOTE ON THE COLON BACILLUS IN ACUTE DIARRHŒA.

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Much has been written of the pathogenic faculties of the *Bacillus coli* family, and a causative *rôle* in neurasthenia constitutes the latest indictment. Amongst these observations the possibility of its being the cause of certain acute intestinal conditions does not appear to have received an undue share of attention. In view of the protean nature of the pathological lesions indisputably due to *B. coli* there appears reason for crediting it with the ability to excite an acute inflammation in its natural habitat, should the local resistance become lowered, or the normal virulence of the organism be enhanced.

In Mauritius acute diarrhœal disease occurs not uncommonly, and varies in intensity from a mild type with little general reaction to a severe infection of dysenteric nature with marked constitutional symptoms. Formerly, as a rule, the diagnosis "dysentery" was applied to these conditions, which designation, in many cases, defined the symptom complex rather than the ascertained cause.

The attempt to investigate the local diarrhœal infections was commenced by cultural examinations of the surface and intestinal organisms isolated from flies caught in various parts of the camp; at the same time efforts were made to ascertain the whereabouts of the flies' origin by means of coloured lycopodium. However, in view of the almost uniformly negative results of the concomitant fæcal cultures, the fly examinations were not long continued. It is of interest, however, that the only organism of known or suspected pathogenicity isolated from any of the flies was *B. proteus vulgaris*, which organism was isolated from the fæces of a severe case of diarrhœa some weeks later.

On the admission to hospital of any patient presenting diarrhœal symptoms, the following examinations are carried out at present as a routine procedure—and here one may state that obstinate constipation is the rule in the local enterica.

(1) A stool is passed into a heated utensil and immediately examined microscopically on a warm stage.

(2) Cultures are made on lactose and other media and incubated.

(3) Mucus, if present, is stained by various methods and examined microscopically.

In addition, blood and urine cultures are taken if the patient shows any febrile reaction. These tests are repeated several times if a negative result is obtained.

During the past nine months the dejecta of seventeen patients suffering from diarrhœal disease of unknown origin have been examined thoroughly by the foregoing methods with the following findings:—

Specimens from one patient showed *E. histolytica*.

Two patients' fæcal cultures showed non-lactose fermenting colonies, which on investigation proved to be *B. proteus vulgaris* in one instance, while from the other an organism corresponding with Bacillus "A," sub-group "a," in Graham-Smith's classification[1] was isolated.

In the fourteen remaining cases repeated investigations showed the presence of no abnormal organism.

The cases of two men whose symptoms had persisted without amelioration for twenty-one and fourteen days respectively first led to a consideration of "excretal" *B. coli* as a possible causative organism. Repeated fæcal cultures had shown "excretal" *B. coli* colonies only, more particular examination of which proved *B. cloacæ* to predominate. A series of serological examinations was then carried out, and these patients' serum was found to agglutinate *B. cloacæ* in dilutions up to 1 in 50. Without loss of time a *B. cloacæ* vaccine was made and injected, and the almost immediate relief and the speedy cessation of symptoms in both cases appeared more than a coincidence. In a third similar case no *B. coli* antibodies could be discovered, but the injection of a vaccine, made as in the foregoing instances, was attended with a like result. In the later cases no serological tests were performed owing to the vaccine therapy having been commenced before antibodies had been formed in an appreciable amount.

The following is the present procedure adopted in this hospital in every case of diarrhœal disease. On admission the various investigations already noted are performed as thoroughly as possible, during which time the patient is treated by such methods as may appear indicated; if the symptoms show any sign of abating, no further therapeutic measures are employed. But if consecutive examinations show the presence of no abnormal organism, and if the symptoms still continue without abatement on the completion of these tests, injections of a *B. coli* vaccine are commenced. Failing the marked predominance of any one coliform organism a vaccine consisting of several strains of *B. coli communis*, *B. cloacæ*, *B. lactis ærogenes*, &c., is employed; the usual initial dose being 50,000,000 organisms, increasing amounts being injected at intervals of about two days.

Of the fourteen cases in which no abnormal organisms could be detected, eight resisted ordinary therapeutic methods, and were treated with vaccines. Captain A. N. R. McNeill, in charge of the medical ward, states that, having employed the ordinary intestinal antiseptics and

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[1] Report of the Local Government Board (Medical Officer's Supplement), 1911, Appendix B.

sedatives without evident effect in these cases, he found the results of vaccine therapy "most striking." Major V. J. Crawford, the officer commanding the hospital, who followed the cases closely and gave every assistance, concurs in this opinion.

The following are extracts from the medical case sheets of two patients treated on the lines advocated:—

Case 2 (subacute).—Temperature about 99° F. Pain and tenderness in abdomen; bowels moved three to six times per day, little fæcal matter with much blood-stained mucus being passed. Blood culture negative. Under ordinary treatment for fourteen days—ol. ric. c. tr. op.; later, ipecac. c. ac. tan.—without apparent benefit. Fæcal examinations showed the presence of "excretal" *B. coli* only, among which colonies *B. cloacæ* predominated. The blood serum was found to agglutinate *B. cloacæ* in dilutions up to 1 in 50. Drug treatment stopped, and 75,000,000 organisms of an autogenous *B. cloacæ* vaccine injected; two days later the patient is noted as "very comfortable and motions less fluid." An injection of 150,000,000 was then given. Five days after the first injection the motions are noted as "normal" in consistence and number. Two further doses were given before discharge.

Case 8 (acute).—Temperature 102·4° F. About a dozen motions per diem, consisting chiefly of mucus and blood; much pain and tenesmus. Patient "looked very ill." Blood culture negative; fæcal examination showed "excretal" *B. coli* only. Treatment: Ol. ric. c. tr. op.; liq. hyd. perchlor.; later, ½ gr. morph. hypodermically. The patient showed no improvement; 75,000,000 organisms of a mixed vaccine were injected on the fifth day, followed by 150,000,000 two days later. After the first dose the patient was more comfortable, and forty-eight hours subsequent to the second injection the temperature fell to normal, but the same evening rose to 99·6° F. The following day a dose of 200,000,000 was given, and twelve hours later the temperature fell, and remained normal. During this time the intestinal condition and the patient's general state progressively improved, and on the sixth day after the first injection the bowels were moved only twice, and thereafter until the patient's discharge from hospital he had only one normal motion per diem. Two further injections were given before his discharge from hospital.

It may be urged that if vaccines had been withheld all these infections might have pursued a similar course. That the amelioration of symptoms should coincide with the employment of vaccines, since the commencement of this treatment in the different cases varied from the fifth day to the twenty-first, appears to be more than fortuitous. To attempt to formulate statistical data from the figures available would, of course, be absurd, therefore the clinical experience is the sole evidence adduced. The clinical results obtained in those remaining cases which previous to vaccine treatment showed no tendency to resolve appear to be remarkable.

A CASE OF LYMPHATIC LEUKÆMIA.

By Major J. COWAN.
Royal Army Medical Corps.

The patient, Private S., aged 24, was admitted to the Station Hospital, Lahore Cantonment, on August 1, 1912, with tonsillitis. There was an ulcer in left tonsil covered with a sloughy grey patch. Smears from the slough were examined twice, and on both occasions the organisms associated with the ulcero-membranous variety of Vincent's angina—viz., (1) fusiform bacilli, (2) spirilla—were present in enormous numbers. No Klebs-Löffler bacilli were found.

On the fifth day in hospital it was noted that there was extremely severe ulceration of the left tonsil. There was marked anæmia. The ulcer was treated with tinct. iodi (B.P.) and he was given sod. salicyl. 10 gr. four times daily, and later iron. His pulse and temperature were normal on the fourteenth day in hospital; on the twentieth day the tonsil was quite healed, and he was ordered full diet and allowed up half the day. There was, however, still marked anæmia, and he was now ordered arsenic in gradually increasing doses. There appeared to be some improvement with arsenic, but this was not maintained. Examinations of his blood for malaria and of his fæces for ova were negative. There is no laboratory here in the hot weather and no blood cultures were made.

When examining smears of his blood early in September, it was noted that the lymphocytes were greatly increased. Total and differential counts of white cells were made on September 14, 1912, with the following results. White blood corpuscles numbered 24,900 per c.mm. and consisted of the following varieties:—

Polynuclears, 7·6 per cent; lymphocytes, 90 per cent; large mononuclears, 1·6 per cent; eosinophiles, 0 per cent; myelocytes, 0·8 per cent.

There was at this time no appreciable enlargement of the spleen, but the lymphatic glands generally were slightly enlarged. On September 28 the lymphatic glands were distinctly enlarged and a blood count showed:—

Red cells: 1,515,000 per c.mm.

White cells: 22,400 per c.mm. of which 93 per cent were lymphocytes.

On October 11 he had severe epistaxis, his temperature gradually rose to 104° F. with a frequent small pulse and severe headache. The hæmorrhage continued and on October 3 he was bleeding apparently from the mucous membrane of the whole alimentary tract; also from the kidneys and bladder. There was marked swelling of the lips and tongue. He died on October 3, the sixty-fourth day in hospital.

A differential leucocyte count early on same day showed lymphocytes 98·25 per cent. The lymphocytes were of the small variety. The chief items of interest noticed at the autopsy were:—

(1) A very large thymus gland, about 7 in. long.
(2) Spleen enlarged, weighed 14 oz.
(3) The lymphatic glands generally enlarged.
(4) Hæmorrhage into the stomach and intestine, and blood-stained serum in pleural and peritoneal sacs.

There are two points of interest in the case: (1) The angina, which no doubt was the origin of the disease, resembled in every respect a condition which is not uncommon in young people, yet acute lymphatic leukæmia is a rare disease; (2) the total number of leucocytes was much lower than is usual in acute leukæmia.

A SECTIONAL FIELD-STRETCHER.

By Captain M. F. GRANT.
Royal Army Medical Corps.

The present pattern of field-stretcher (Mark II) is strong, simple and durable; while most officers will agree that it is well suited for the purpose which it is intended to serve, it is still possible that the apparatus is susceptible of improvement.

Its chief disadvantages seem to be these:—

(1) The weight (30 lb.) is excessive, this is due to the thickness of the poles and traverses. The former, which between them are required to support a weight of not more than 15 or 16 stone, are of the same material and of nearly the same thickness as a set of parallel bars capable of sustaining the weight of a considerable number of gymnasts. The traverses are required to resist a bending strain, and need rigidity rather than weight.

(2) It is clumsy and cumbersome when closed. The stretcher, if carried on the march, as is at times unavoidable, has to be borne by two men, and in such a manner that each bearer may readily hinder the free movement of the other. In addition, the weight is supported by one side of the body only; that is to say, in the most fatiguing and least economical manner possible.

(3) Owing to its length (7 ft. 9 in.) the stretcher is not so well adapted for packing and storing as it might be.

(4) It cannot be used by mounted troops.

The two stretchers described below represent attempts at remedying these defects, chiefly by decreasing the weight and increasing the portability of the apparatus.

The principle adopted has been to divide the poles and canvas into sections in such a manner that a complete stretcher will require two bearers for its transportation, each man being equipped with a carrier attached to a web waistbelt and two web braces. The material is so divided between the bearers that any two of them are able to

assemble a complete stretcher by means of the sections with which they are equipped.

The thickness of the poles has been decreased and the material used for the construction of traverses, brackets, and rollers has been selected with a view to decreasing the weight without interfering with the necessary strength of the parts. Ash has been used for the wood-work in both patterns, but the metal work in Pattern I was made of "Duralumin," while in Pattern II steel with aluminium rollers was employed.

The metal "Duralumin" is an alloy of aluminium, but its exact composition is a trade secret and could not be ascertained; it is employed in the manufacture of orthopædic instruments among other things, but for the purposes of a field-stretcher two disadvantages are apparent. In the first place its cost is excessive, being about twenty-five times as much as that of an equal weight of wrought iron; secondly, some uncertainty exists as to the strength and power of resistance to bending of any given thickness of the material.

For the last reason the joints and traverses were constructed of $\frac{1}{8}$ inch metal and a larger band was used to support the runners, with the result that the apparatus without canvas weighed 26 lb. and very little saving in weight was effected.

In Pattern II, steel joints, traverses and brackets were used with the idea that a smaller weight of steel would have a strength similar to that of a larger weight of wrought iron, without any very material addition to its cost being incurred.

Specification.—The poles are made of seasoned ash, and are circular in section with a circumference of $5\frac{1}{2}$ in. and a length of 7 ft. 8 in. Each pole is divided into four sections, each section being 1 ft. 11 in. in length.

Joints.—The sections of the poles are connected together on each side by three tubular joints made of "Duralumin" $\frac{1}{8}$ in. in Pattern I, and of steel $\frac{1}{16}$ in. in Pattern II; each joint is 10 in. in length.

The joints are fixed to the two end pieces of the poles, but those connecting the centre sections are loose, being retained in position by steel pins passing through holes at either end, bored through the metal of the joint and in the wood of the pole. The pins are secured to the wood work by light chains or cords. Similar pins are provided for the end section, to secure the joints at their meeting with the inner sections of the poles.

Eight broad steel hooks are screwed on to the outer side of each pole to secure the canvas.

Traverses.—The traverses are similar to those in use with the service pattern of stretcher, but are made of steel $\frac{5}{8}$ in. broad and $\frac{1}{4}$ in. thick. The outer ends are fixed to the roller bracket by nuts. When opened the traverses allow a width of 1 ft. 11 in. between the poles.

Rollers.—To each of the four end sections an aluminium roller, 2 in. in diameter, is fixed in a steel bracket in such a manner that the canvas of the stretcher is raised 6 in. from the ground.

I.—Bearer carrying one half of stretcher, in carrier. Side view.

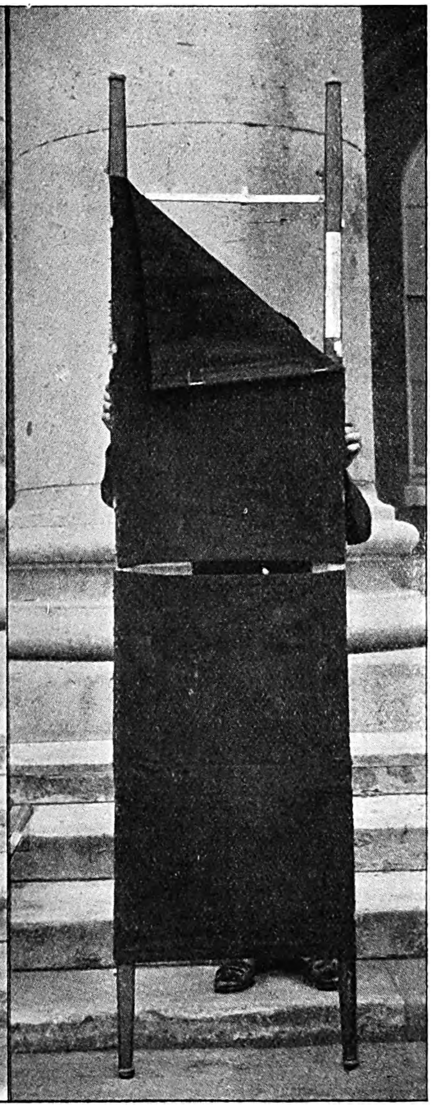
II.—Bearer carrying one half of stretcher, in carrier. Back view.

(In Pattern I, a "Duralumin" band, semicircular with protruding ends directed downwards, is used to carry the rollers.)

The brackets are placed with their centres 11 in. from the outer ends of the poles.

Canvas.—The canvas is of similar material and appearance to that

III.—Framework of Patterns I and II. Pattern I is complete; Pattern II only one half shown.



IV.—Pattern II complete. Canvas turned down at one corner to show the method of attachment.

in use with the service pattern stretcher, but is divided into two pieces, each 3 ft. long and 1 ft. 11½ in. broad when completed.

A pocket is made along the sides of each piece by sewing down the edges of the canvas; two apertures are cut in each pocket so as to correspond, when *in situ*, with the position of the hooks attached to the poles.

Each pocket contains a steel rod, ¼ in. in diameter, broken in the middle so as to allow the canvas to be folded across its length for facility in packing.

When required for use the portion of the rods exposed by the apertures in the pockets engage with the hooks attached to the poles in the manner familiar to all who use "X" camp furniture.

Slings.—An experimental sling was made of webbing 65 in. long, provided with a grip-plate at each end to form the two loops and provide means of adjusting the length. To one loop is attached a buckle similar to that in use in the webbing equipment waistbelt. The intention is that by this means the two ends of the sling can be joined together into one continuous band, for use in the manner described for putties and pugarees in R.A.M.C. training.

Weight.—The total weight of the apparatus complete is between 25 and 26 lb.

The Carrier.—The carrier is similar to the coat-carrier used in the Infantry web equipment; the belt is identical and the braces practically the same as those used in that equipment. It is intended to carry a great-coat in addition to the stretcher. The points in which the stretcher equipment differs from the Infantry equipment are the following:—

(1) The braces are 2 in. wide, as in the Infantry equipment, except at the buckle end, where they are 1 in. wide, so as to fit the brace attachments.

(2) Brace attachments and diagonal straps are supplied to take the place of ammunition carriers in adjusting the balance of the load. This involves the addition of two extra three-bar buckles to the belt.

(3) The carrier has an additional horizontal strap for securing the sections of the stretcher.

Conclusion.—The stretchers described above are experimental, and are for that reason more expensive than the same articles would be if manufactured in bulk; but even in the latter contingency it is probable that the cost would be greater than that of the present Mark II pattern.

When completed, several defects came to light; they are noted for the benefit of anyone whose interest in field-stretchers may lead him to make experiments on similar lines. The hooks on the poles (to engage the canvas) should be arranged at points on the circumference of the pole having a definite relation to the holes for the pins which secure the joints; otherwise the sections are not interchangeable. It may be necessary for

two holes to be bored in the poles at right angles to one another. The hooks on the poles and the openings in the canvas should be fixed at the same distance apart throughout the apparatus; otherwise the canvas will not readily engage. It may be necessary to fix eyelets and laces to the ends of the canvas so as to join the two pieces together and avoid a gap in the middle of the stretcher.

A carrier in the form of a pack, or provided with a canvas bucket or trough at the lower end to support the sections of the stretcher, would probably be more satisfactory than the pattern described, in which the sections are retained in position solely by horizontal and vertical straps.

It is probable that the thickness of the poles can be further decreased without loss of efficiency. My thanks are due to Acting Serjeant-Major T. W. Cardwell, R.A.M.C., for taking the accompanying photographs; and to Serjeant A. J. Burke, R.A.M.C., for his assistance in arranging some of the details.

SUGGESTIONS FOR FIRST-AID OUTFITS FOR THE ROYAL FLYING CORPS.

By Captain E. G. R. LITHGOW.
Royal Army Medical Corps.

First-aid outfits for the Royal Flying Corps should be of two kinds, one to be carried on every aeroplane, the other in the mechanical transport.

With regard to the former, it is not desirable that it should be carried on the person of the pilot or observer, since this would entail much handling, and possible damage or loss. A suitable position for the outfit can easily be found in all types of aeroplane—*e.g.*, in the fuselage—where it would be accessible and protected from oil, &c., without being unduly conspicuous, or in any way interfering with the control of the machine. Both pilot and passenger should receive instruction in its use, and in the treatment of minor disabilities and ailments, such as wounds, burns, &c. The weight of the outfit complete should be limited to about 1 lb., and it should be packed in waterproof material.

The first-aid outfit for the mechanical transport should be more complete, and sufficient for the possible requirements of about 140 men composing the squadron. Medical and surgical panniers, and a field fracture box similar to the existing patterns, but reduced in size, would be suitable, and could be carried on the motor ambulance, which should accompany the squadron. This equipment, of course, would be used by the medical officer.

Aircraft have now become so reliable and powerful that it is quite practicable to have machines specially fitted to carry medical and surgical

equipment; these machines could search for wounded in the field, and enable urgent cases to be treated on the spot, as well as quickly notifying Army Medical Headquarters of the numbers to be collected. It is understood that the question of "Red Cross Aeroplanes" is already receiving the attention of the Powers signatory to the Geneva Convention. These aeroplanes must of necessity be piloted by medical officers.

Lecture.

THE WORK IN SERVIA OF THE WELSH UNIT OF THE BRITISH RED CROSS SOCIETY.[1]

By Captain H. J. M. CARTER.
Royal Army Medical Corps.

The British Red Cross Society's Unit Servia No. 1, known as the Welsh Unit, came into existence on Saturday, November 9, 1912, when the men who had been selected by Sir F. Treves to form its personnel reported themselves at Millbank Barracks, where Colonel B. Skinner, Commandant R.A.M. College, had kindly placed a barrack-room and office at the disposal of the Society. Colonel Skinner also lent the services of Quartermaster-Serjeant Walker to assist in mobilizing the unit, and to give the men preliminary instruction in First Aid, and show the contents of the Army pattern medical and surgical equipment which was to accompany the unit. Arrangements were made for the disposal of the orderlies' plain clothes, and they filled in forms stating their next of kin, and to whom they wished their pay to be sent during their absence from England. As the following day was Sunday, and some men had matters to attend to, while others wished to say good-bye to their friends, they were all given permission to go away provided they reported themselves by 9 a.m on Monday. Instruction was continued on Monday and the men slept in barracks that night; their Red Cross uniform had been issued to them, and their other clothes made into parcels and labelled for transmission to their friends when the unit had started. The uniform issued was good and warm, similar to the Field Service dress of the British soldier. Instead of a long greatcoat a short one was issued, of the type known as the British warm. Each man was also given a pair of rubber top boots, which proved most useful. The equipment consisted of a belt, haversack, and water-bottle, cavalry mess-tin, jack-knife and lanyard, brassard and identity disc. On Tuesday 12th the work of

[1] Lecture to the Voluntary Aid Detachments, Wales.

preparation for departure was continued. One of the surgeons and one N.C.O. were sent to Victoria Station to check all the baggage and see it loaded into the truck. In the afternoon the men were paraded for inspection by Lord N. Crichton Stuart, Mr. D. Davies, and Mr. Ridsdale, Chairman of the British Red Cross Society, who addressed the unit and wished it luck. A photograph was taken of all the men available. At 7.30 p.m. the unit was paraded and marched to Victoria Station. Many friends came to see us off by the 8.35 train to Folkestone, amongst them M. Slavko Grouitch (Servian Chargé d'Affaires).

The unit consisted of four surgeons, three dressers (medical students), and thirteen orderlies.

With the exception of two they were all old soldiers or sailors, and of the general duty orderlies the majority had experience of nursing which they had gained in India as hospital orderlies. The medical and surgical equipment was practically that of a tent subdivision of a field ambulance and was of the latest pattern. All the dressings and medicines were carefully packed in panniers so as to be easily transportable. These panniers look small, but contain a very large amount of compressed wool, lint and bandages, and the medicines are in tabloid form. Two reserve dressing boxes were taken full of extra gauze, lint, &c. A large number of blankets, sheets, pillows, pillow cases and waterproof sheets, and also bales of warm clothing, cardigans and flannel shirts were provided. For feeding the sick and wounded cases of condensed milk and tinned soup were supplied. The Lemco and Oxo Company gave two large boxes of service Oxo.

Medical comfort panniers were also taken. For the personnel of the unit eight days' reserve rations were taken, each ration consisting of tinned meat, biscuits, tea, sugar, chocolate, &c., enough to last a man twenty-four hours if no other food was available. All the basins, kettles, feeding cups, &c., for feeding the sick and for cooking purposes were made of enamelled iron; they were packed in large basket panniers. Carpenters' tools for making splints, &c., were also carried.

The journey to Belgrade via Flushing, Frankfort, Vienna and Budapest, was made without difficulty. Messrs. Cook's interpreters met us at Frankfort and Vienna, and at the latter place we were fortunate in arriving in time to catch the train on without any delay.

The unit arrived at Belgrade on Thursday night, 14th, at 10.30, and was met by the British Vice-Consul, Mr. Blakeney, Colonel Sondermayer, Chief of the Servian Medical Services, and Lieutenant Yovanovitch, Adjutant to the Commandant of the city. The latter spoke English well and had held the post of Montenegrin Commercial Agent in London up to the commencement of the war, when he was recalled for service. Carriages were ready and we were all driven off to a large school, where we were to be billeted. A Russian Red Cross unit was already there waiting to get permission to go further forward. Everybody was glad

the greater part of the journey was over and turned in as soon as possible, about 1 a.m.

Next morning I went with Lieutenant Yovanovitch to call on Colonel Sondermayer at the Ministry of War and to get instructions. He was anxious for us to take over a large building and form a base hospital, but I explained that our equipment was only suitable for a mobile medical unit and we had hoped to get up near the fighting. It appeared as if we should have to stay in Belgrade, as we were there to assist the Servians and comply with their orders, so we went to inspect the barracks of the 7th Infantry Regiment, which were to be handed over to us. This regiment was said to be one of those which had lost heavily at Kumanovo, the first big battle the Servians fought in the war. It was quite close to the Ministry of War and was already equipped with 400 beds. If we had been compelled to remain there it would have made a good hospital. Arrangements had been made for several English-speaking ladies to come and assist us and act as interpreters. However, Colonel Sondermayer agreed to telegraph to the head-quarters in the field asking if we could be sent forward. Meanwhile we were to wait in Belgrade. Surgeon-General Bourke, who was acting as Director of the British Red Cross units in the North Balkan States, arrived that evening from Sofia, where he had been with the Bulgarian units which had left London before us. On Saturday, 16th, Surgeon-General Bourke and I went to the Ministry of War and were introduced to Colonel Boyovitch, Minister of War, who thanked the unit for coming out to assist the wounded. No answer had yet arrived from head-quarters at Uskub. The Servian authorities asked for a complete list of all the members of the unit, so that stamped brassards could be issued to them in accordance with the Geneva Convention. The afternoon was spent in the barracks making provisional arrangements for rations, storerooms, operating theatre and rooms for the personnel. On Sunday an answer was received from head-quarters at Uskub that we were to stay at Belgrade, so we moved into the barracks and unpacked our equipment to be ready as soon as possible for the wounded that were expected when Monastir was taken.

On Monday when nearly everything was ready Colonel Sondermayer sent for Surgeon-General Bourke and showed him a wire which said, "Send English Mission to Skoplie." Skoplie is the old Servian name for Uskub. Monastir had been taken. We then packed up again. Mr. Milan P. Baic, a Servian gentleman who had returned home at the commencement of the war, volunteered to accompany us as our interpreter. That evening half the unit was inoculated against enteric fever. On the 19th we were given a covered truck for our equipment, and two coaches for the personnel, and we started for Uskub. Trains were very crowded with soldiers and others going up to the front. Two French surgeons who were on their way to Lescovatz to work in a hospital there were unable to find room, so we took them into our carriage.

The next day was spent in the train running up the valley of the Morava, a big river which was in flood. To pass the time we vaccinated one another.

At Kumanovo station we saw many captured Turkish guns awaiting transport to Servia, and about 8 o'clock or later we passed over the battlefield of Kumanovo. It was a fine moonlight night and we could see villages that had been burnt during the battle, which was fought on either side of the line.

Arriving at Uskub about 10 p.m. after twenty-eight hours in the train we were met by Mr. Peckham, British Vice-Consul, and Colonel Lazar Gentshitch, who as Senior Medical Officer on the Staff of General Putnik was in charge of all medical arrangements. The men were sent up to a large school, where the Russians whom we had met in Belgrade gave them tea. We were given a railway carriage to sleep in that night and were very comfortable.

Colonel Gentchitch asked whether we wished to take over a hospital at Uskub, or get forward. I asked to go on to Monastir, as there were many wounded there, it having only been captured two days. He agreed to do all he could to send us forward, when General Bourke and the Scottish unit arrived next day. The Scottish unit arrived late on the 21st. It was raining hard. On Friday Colonel Gentchitch went with Mr. Moxon of my unit and an interpreter to Veles, which was the railhead. From there the road over the mountains led to Monastir. He wished to see the arrangements for transport. Monastir is about four days' march from Veles, the rate of march depending on that of the ox-wagons which form the transport. He returned next day and said he was sorry, but for military reasons we could not be sent further forward, but he would give us a hospital in Uskub. Surgeon-General Bourke went with him to the Turkisk Municipal Hospital, and decided to take it over and run it with both the Welsh and Scottish units under the command of Major Douglas, R.A.M.C., who had brought out the Scottish unit.

Major Douglas took over the charge of the hospital and both units on the 23rd, and from that time until we disbanded the two units worked together.

When we arrived in Uskub there were already installed three Russian Red Cross Ambulances from Kieff, St. Petersburg, and Moscow, which occupied two large schools; also one French Ambulance, which was in a school. There was also a Roumanian hospital, which consisted of two Doecker huts, in addition to a military stationary hospital in the citadel, and a large school which had been converted into a hospital for enteric and dysentery cases. The hospital taken over by the British Red Cross units was situated on a flat piece of ground to the east of the town, in a triangle formed by the River Vardar, the railway line, and the Kumanovo road. It was about 2½ miles from the railway station, and the approach

was along the right side of the river by a very bad and muddy road. This road was soon taken in hand by the municipal authorities and repaired. The hospital consisted of two large one-story buildings, with an administrative block between them, and a cookhouse behind. At the commencement of the war it was barely completed, and its first patients consisted of wounded from Kumanovo.

The front of the buildings looked south. The east block had evidently been intended for surgical cases, as it contained two well-lighted operating theatres, only one of which was partially equipped. The block on the west was for medical cases. In the central administrative block were store rooms and a dispensary.

In this dispensary there was a supply of ordinary drugs and a great deal of cotton wool which had been left by the Turks.

A small room off one of these theatres contained the dressings and equipment of the Swiss Red Cross Society, the members of which had gone on to Monastir attached to a Servian Field Medical unit. As the Swiss unit consisted only of three doctors and had no nurses or orderlies with it, the question of transport did not arise. The equipment was locked up and left under the care of the Servian medical officer who remained in the hospital.

In the hospital were about 100 bedsteads, which required putting together, and a number of new mattresses with native blankets and coverlets. That was all the equipment we found available.

To assist in keeping records of the sick and wounded, and in making arrangements for their discharge, the Servian authorities left an officer of their medical service, and with him some orderlies to look after patients' kits in the pack store, to attend to their wants and cook food for them. We had arranged for supplies to be obtained daily by one of the Servians, who knew the routine and to whom we should apply. We could not cook in a way suitable to the tastes of the patients who were convalescent, and most wounded men who were doing well had good appetites. One Red Cross unit in Uskub employed their own cooks to prepare the patients' food, and said it was difficult to satisfy their patients, who preferred their native dishes. For this reason all meat and bread was drawn, cooked, and issued by the Servians themselves. The Servian orderlies were very useful in attending to the wants of the patients. The language question is always a difficulty, especially at first. An interpreter would be required in every ward if every small matter had to be translated. After a while we learnt a few words and were able to understand what was wanted. A few simple phrases are easily learnt and relieve the work of the interpreters. For this work, in addition to M. Baic and Dr. Todorovitch, who came from Belgrade with the Scottish unit, we had two Servian ladies who had been working in the hospital before we took it over. They spoke French and were of great assistance to us. We were given a portable steam disinfector for disinfecting bedding and clothing, and we built an incinerator for the disposal of soiled dressings, &c.

After we had been in the hospital for a few days, the authorities lent us a large double-fly tortoise tent, and by making all the orderlies sleep in it we were able to make room for more patients.

On the 24th we were supplied with ox wagons to bring our stores and equipment from the station, where it had remained unloaded since our arrival, in the hope that we would proceed forward, and we then started to equip the wards with the material we had brought out for a mobile unit. All the panniers were unpacked and the bales of bedding broken open and distributed round the wards. Each surgeon was given basins, towels, sheets, blankets, &c., for his ward. After seven hours' work we were ready to receive the wounded.

The first batch arrived on the 26th. They came from Monastir via Prilep and Veles, and had been about four days on the road and in the train. From Monastir to Veles the road runs over the mountains, which were covered with snow. There were about forty wounded who had been put out at Uskub, which was the first place where they came near stationary hospitals. All the wounded fit to travel by the hospital trains were taken straight to Servia, but there were always some who could not stand the journey well, and these had to be put out on the way. The cases that came to us were nearly all septic, and were suffering severely from the hardships of the journey from Monastir. They were at once washed and put to bed, and then fed on hot Oxo, bread and soup. They were then dressed. Many preferred to sleep, and thought that after days in wagons sleep was a more important matter than dressing. However, they were all examined and cleaned up, and then left to sleep as much as they wished.

Surgeon-General Bourke then left, as he had the other units in Bulgaria and Montenegro to look after.

The next lot of wounded came in on the nights of the 28th and 29th. They were also from Monastir. Amongst them were two cases of paralysis from spinal injuries, one case shot through the chest, one through the abdomen, and one shot in the head. The remainder were mostly septic wounds of the extremities. These were practically the last of the wounded we received in batches. Nearly all the wounded fit to travel had been evacuated from Monastir, and from this time onward we began to get a large number of sick, in contradistinction to wounded, from troops who were passing through Uskub on their way to other districts where there was still fighting. From November 26 to January 23, 637 cases were admitted to hospital. In addition to these we treated a large number of out-patients, of whom no careful record was kept.

The hospital was organized as follows:—

An orderly medical officer was detailed daily. He was on duty twenty-four hours and had to remain in the hospital to be available when necessary; he also had to inspect the patients' dinners and go round at night to see that everything was all right.

The care of the sick was divided between six surgeons, each of whom had charge of one or more wards. Each surgeon had a dresser, one of the medical students, a nursing orderly and a general duty orderly to assist him. A night duty party, consisting of two nursing orderlies and two general duty orderlies, was detailed for a week at a time. This arrangement was found to answer better than having men on duty for four hours and then calling their reliefs. The theatre was under the care of two medical students, who attended to all the surgical equipment and prepared everything necessary for operations. Two cooks were appointed to prepare the rations for the personnel. One had considerable experience as a caterer and used to go to the local market with one of the interpreters to purchase vegetables, &c. One man was put in charge of the disinfector and incinerator and acted as sanitary orderly. One of the men was very handy as a carpenter and we employed him in that capacity to make splints, inclined planes, and to put up shelves in the wards. He did all his work with empty packing cases and the tools carried in one of the panniers. With barrel hoops he managed to improvise very good cradles and apparatus for slinging broken legs, &c., which were greatly admired and commented on by visitors. They said we were very good at improvising. The dispenser took charge of all the medicines and medical panniers. An admission and discharge book was kept by the senior N.C.O. so that we would have some record of our own of the number of patients, their names, regiments, and wounds or ailments apart from the one kept by the Servians. This book showed the date of admission, number of days in hospital and disposal of each patient. Notes on each case were kept by the dresser, who was responsible for the men in his ward. The daily routine was: Up at 6.30, parade at 7 a.m., when all went to their wards and saw things cleaned up; patients unable to help themselves were washed and those who could were made to wash themselves; at 8 breakfast; from 9 to 12.30 work in the wards, 12.30 dinner. After dinner, if the work was finished men off duty were allowed to get exercise and do as they pleased; at 4.30 tea and after that any ward work that was necessary; supper at 8.

After the first rush of surgical cases there was an interval before medical cases began to arrive in any numbers. These were mostly bronchitis, pneumonia, enteric fever, and dysentery. They were far more numerous than the wounded. This is usually the case on active service. Another cause was that a large body of troops was billeted in and round Uskub, and there is always more sickness in an army that is stationary than in one on the move. The sick came in in great numbers and soon all our 135 beds were full. They still came and we had to accommodate them somehow. Patients who were not very ill had to be put three sleeping on two beds close together. It is not a satisfactory arrangement, but it was the only thing to do. The largest number we had in at one time was 184.

As soon as patients were sufficiently recovered to travel they were discharged to sick furlough and sent to their homes in Servia. Before they went away they were given some warm clothing and a small sum of money. Many had none, and if they had not been given something they would have suffered great hardship on their way to their homes, which were in many cases at great distances from the railway. This matter was taken up by the Servian authorities and towards the end of our stay every patient received some pay before leaving hospital. Many patients asked specially to be allowed to take their warm flannel shirts away with them; they liked the red ones. In connexion with this an officer in the Servian Army who was very kind to us and gave us every assistance, told us that when he was a small boy he and his parents were driven away from their home by the Turks and for some time had been refugees. Quantities of warm clothing had been sent out from England, amongst them were red flannel shirts. These were distributed to the refugees and he had been amongst those who received them. He was very grateful and said that from that time many a Servian had looked on that colour as a sign of good luck. The Swiss Red Cross surgeons left us most of their dressings and drugs when they went home, and these were very useful.

Lady Paget, wife of the British minister at Belgrade, was very kind and sent us money and clothing to be distributed amongst the Allies and Turks alike. There were many refugees in the town who had lost all they possessed during the war and were quite destitute. To look after these there was a local committee, of which M. Hadjiristitch, the mayor of the town, was chief. This Committee knew well the necessities of the refugees and where they were to be found, so we handed over to it 600 francs of the money, and the remaining 400 francs we kept and gave to soldiers leaving hospital on their way home. We proposed to make arrangements to provide hot Oxo and any medical assistance to refugees coming by train, but, as the opportunity did not arise, with the consent of the mayor a soup kitchen was started in a small hut near the hospital, and hot soup given to any refugee children who liked to come for it.

One of the difficulties which troubled us was the occasional scarcity of fuel. Wood was burnt chiefly, but the local supply was not great. It had to be brought by train and the supply sometimes ran low, so the boiling of water in large quantities was a serious matter. When we arrived there were a lot of small trees along the road in front of the hospital. These were soon cut down by parties in want of fuel. When a train load came in there was plenty. At first our only water supply was from a shallow well. This had to be boiled before drinking. It was muddy, and to clarify it we improvised rough filters out of paraffin tins at the bottom of which was a layer of cotton wool and tow. Alum was added to the water. These filters served their purpose very well until the municipal water supply was laid on to the front of the buildings.

The hard work and want of exercise unfortunately resulted in some cases of sickness among the orderlies and dressers. Our patients objected strongly to open windows, and it required constant watching to keep the wards warm and at the same time ventilated.

At first influenza was the trouble, and then two dressers contracted enteric fever from patients whom they were nursing. Both dressers had been inoculated. One was a mild case, but the other, I regret to say, was very severe and ended fatally, just as we were preparing to return to England. His loss was deeply felt by all. He was a hard worker and careful of his patients, in attending to whose wants he became infected. The Servian authorities showed their sympathy in a way which we will never forget. General Putnik expressed a wish that as the man had died as the result of his efforts to help the Servian sick and wounded he should be buried with full military honours. The General Staff, on behalf of the Servian Army, sent a telegram of condolence to the man's mother in England, and we received many other indications of sympathy from all ranks of the army and from other Red Cross organizations working in Servia. The funeral took place on January 19. The military authorities sent a company of infantry and a band, and representatives of all units stationed in Uskub were present, amongst them Colonel Marinovitch, commandant of the town.

The Russian Red Cross unit from St. Petersburg brought a large wreath of ivy, and Major Mikhailovitch, representing the Servian Medical Service, made a funeral oration at the grave. The Archbishop of Uskub ordered a memorial service to be held in the old cathedral.

During the time we were in Uskub we had many visitors at the hospital. The Crown Prince came to see the patients and spoke to all of them, inquiring where they had received their wounds, and where they came from. He was specially interested in a man who had been wounded at Monastir, and arrived in Uskub almost completely paralysed. He gave orders that the man's relations should be sent for from Servia to see him. These relatives wished to take him home to nurse, but he was not well enough at the time. However, he made great improvement, and when we sent our patients away he was able to walk with assistance. The Servian soldier is hardy and by no means accustomed to luxuries in his home. He is a good patient and is very grateful for all that is done for him.

We were not able to see much of the surrounding country. The time at our disposal in the early afternoon was limited and we could not get far. Nearly all the horses had been commandeered. Colonel Gentchitch sent round one of the staff motor-cars to take a party out to see the battlefield of Kumanovo, about 20 miles away. They had a fine day, and enjoyed themselves thoroughly. He also gave us a free pass on the railway to Salonika for some of our people who were in want of a change. The rest of us never got out of Uskub at all. News of what was

happening in other districts was hard to obtain. The press censorship was very strict. The English papers were our only means of learning how the war was progressing. In Uskub the head of the press bureau was a Captain Georgevitch, who used to send us English papers two or three times a week. An evening entertainment was given by the officers to a number of visitors from Belgrade, who had come up to see the medical arrangements at Uskub. They were all surgeons, nurses and orderlies of foreign Red Cross societies. We were asked to dinner and also as many orderlies as could be spared from duty. After dinner they danced their national dances, which were very quaint and interesting.

It was on that evening that we got orders to pack up and return to England as soon as we were able to hand over the hospital and sick to the care of others. This was not easy, but Colonel Gentchitch arranged that all the wounded fit to travel should be sent to Servia in the next hospital train. The railway bridges near Salonika had been repaired and hospital trains were going up to Monastir to take away the wounded.

The first train that arrived from there was full and there was no room for any from Uskub, so we were asked to wait a few days for the next. In it there was accommodation and we put most of the remaining wounded on board. The others, unfit to travel, were sent to the Military Hospital in the citadel. The dysentery and enteric cases and the ordinary sick were left in the hospital in the charge of a Servian doctor and orderlies. One of our own men was still suffering from enteric and unfit to travel, so we decided to leave a surgeon and some orderlies to take care of him. They reached England about a month after us.

With regard to the hospital train, which took away the wounded who were still undergoing treatment when we received orders to come home, it will probably interest you to hear how it was equipped. It was made up of goods wagons fitted with apparatus for slinging stretchers and ordinary passenger coaches into which improvised beds had been fixed. All the inner fittings of the passenger coaches had been removed and wooden frames for carrying mattresses were fixed to the floor along one side. These frames were made in pairs and stood about 18 in. from the floor. On them were thick straw mattresses. Three patients lying down could easily be placed on each pair of mattresses, so that a coach could carry twelve lying down. Along the opposite side of the carriage was a long seat for patients able to travel sitting up. The doors of the carriage were at the ends, so that there was through communication from one end to the other. In these carriages the patients lay on rigid fixed beds, whereas in the goods wagons the method of slinging the stretchers was supposed to lessen the swaying and jolting of the train. All the patients preferred the fixed beds to the swinging stretchers. Each pair of stretchers was slung on wire ropes which were attached to the floor and roof of the wagon. Windows had been cut in the sides and each wagon was provided with a stove. The spare floor space was occupied

by patients sitting down. It was possible to walk from one end of the train to the other. There was a separate coach for the commandant and officers and one for an office, dispensary, and for dressing any patients who might require it. There were arrangements for cooking soup and boiling water, but the feeding of the patients was mainly carried out at stations where the train stopped. Special station parties were organized by the Red Cross Society for this purpose. They were notified when the train was expected and made the necessary preparations to feed the wounded on their arrival. There was another type of train made of passenger coaches stripped in the same way and fitted with a French apparatus. This was made of iron bars and to these stretchers were attached by means of springs. Twenty-one patients could be accommodated in each carriage.

We left Uskub on January 23 by the afternoon train. All articles of equipment worth bringing back to England were sent down and loaded into a truck. There was no equipment in the wards, so we left behind what was necessary for the proper care of the patients still in hospital. Material used in the hospital was handed over to a representative of the mayor of the town for its use, as the buildings belonged to the municipality. Reserve blankets, &c., were taken by the British Vice-Consul for distribution to those who had suffered in the war, and the last of the Oxo was given to the representatives of the Macedonian Relief Fund for use among the poor refugees.

Many officers and friends came to see us off. General Misitch sent us a message wishing us a pleasant journey and regretting that he was unable to come down personally. A band was sent which played "God Save the King" and the Servian National Anthem. We had a great send-off and the Servians showed how they appreciated our work and the goodwill of the British who had sent us out to help them. We arrived in Belgrade next morning and were billeted in the Military Academy. People were anxious for us to wait in Belgrade for a few days in order that they might entertain us, but that was not possible.

Arrangements for tickets had already been made by Surgeon-General Bourke, so there was only the baggage to be weighed and registered. Colonel Sondermayer invited all the medical officers to dinner that evening, and in wishing us good-bye he thanked us cordially for our work and the assistance we had given.

We left Belgrade in the early morning of the 25th and arrived in London on the 27th, when the Welsh Unit, less the small party left behind, was disbanded.

Reviews.

OPERATIVE SURGERY. By John Fairbairn Binnie, A.M., C.M. (Aberdeen); Surgeon to the General Hospital, Kansas City, Mo. Pp. x and 1,153.

This work is equal to the best; it was originally issued in one rather small volume, in which no account was given of operations on joints and bones; later on it was determined to include these subjects.

The present edition is the fifth of Volume I., and the second of Volume II. It is divided into three chapters, and has 1,365 illustrations, a number of which are coloured. We have not seen the equal of this book in the facility which it affords of rapidly reviewing the steps of an operation; in some instances, indeed, the illustrations are self-explanatory of the various stages which can thus be seen at a glance, so to speak.

In addition to the ordinary matter relating to surgical procedures mentioned in smaller text-books, the author has taken great trouble to give references to various British and Continental writers and has added many extremely sound suggestions from his own vast experience which will not fail to be of the greatest assistance to those of a less ripe knowledge in selecting methods of operating under various circumstances.

The various methods of opening the skull are well discussed. The composition of Horsley's wax as given is not quite correct. The steps of the heroic operation of callosal puncture, as performed by v. Bramann, are clearly given, as also are the conditions in which both he and Anton consider the procedure indicated.

The extremely rare operation of hypophysectomy is carefully described, and there is little doubt that as knowledge of the disease or diseases of the pituitary body increases, cases suitable for the operation will be recognized at an earlier stage and the result of their surgical treatment will become very much better than it is at present. The description of the lymphatics of the larynx shows clearly the reasonableness of certain dicta regarding the conditions required for successful thyrotomy for malignant disease.

On p. 226 will be found a method of ensuring the non-removal of the parathyroids during thyroidectomy.

Operations for the treatment of phthisis pulmonalis and alveolar pulmonary emphysema are well given, as are also those for exposure of the pericardium and heart and the posterior mediastinum.

Chapters xxx to xlii deal with operations on the abdomen. Various methods of opening and closing the abdomen are fully described. Under the heading of treatment after laparotomy the author states "the tendency of surgeons is towards letting the patients sit up and move about at an early date, even a very early date, after operation," and that this appears to him "risky and well calculated to cause ventral hernia."

In operations on the lower half of the abdomen, the author adheres more or less closely to the rules he has formulated for the after-treatment of hernia operations, viz.: four weeks rest in bed; for six weeks

after the operation the patient should be in the recumbent posture when the bowels are being moved; for a period of three months after the operation there should be no hard manual work. The author has found these rules exceedingly satisfactory, but states that when the abdomen has been opened by the gridiron method of McArthur and McBurney the above do not apply; with this we fully agree.

In connexion with Lembert sutures, the author states that "it has been said to be easy to pick up some of the submucosa on the point of the needle without penetrating the mucosa"; he considers this to be an "iridescent dream" and asks anyone who doubts this statement to try to suture two sausages together without touching the contained meat (sausage casings consist of the submucous coat of the gut).

Answering the question "When ought one to advise operation in appendicitis?" the author's personal views are:—

(1) In acute appendicitis operate within forty-eight hours of the inception of the disease. The earlier the better.

(2) After the lapse of forty-eight hours, it is safer to adopt Ochsner's plan of non-operative treatment, except in young children and the aged.

(3) After the subsidence of the acute attack, when pulse and temperature have become normal, when pain and tenderness and rigidity have disappeared, when the bowels are acting well without causing disturbance, then the interval operation ought to be performed.

(4) If seen late, operation is imperative if the general condition of the patient indicates a dangerous amount of absorption; if the tumour is increasing markedly, and there are signs of the infection spreading. When, however, the tumour is not increasing, or is decreasing, and the temperature and pulse are moderate and in proper relation to each other, there is, on the whole, less danger in delay than in immediate operation. Such cases almost always improve under the Ochsner's regimen to such an extent that a safe interval operation becomes possible. The danger of immediate operation is not merely that of shock and of general peritoneal infection, but the manipulations necessary for the evacuation of the encapsulated pus inevitably open up channels by which toxins are absorbed in quantities which may prove fatal. Nature, when aided by rest, can safely encapsulate, and ultimately remove even considerable quantities of pus in the peritoneum.

(5) In cases of appendicitis with generalized peritonitis the general rule is to operate at once and thoroughly.

Sliding hernia, an important condition rarely described in text-books, is carefully gone into and the methods of treating it and obviating its recurrence outlined.

Under operations on the spine the cul-de-sac of the dura mater is described (the author quotes Chipault) as corresponding to the level of the "fifth lumbar interspinous space"; this is too high, it reaches to the second or third sacral vertebra.

In the space available for a review, it has only been possible to refer to a few of the more important subjects dealt with. We must heartily congratulate Mr. Binnie on his most excellent, thorough and complete work. It is a full and modern statement of the subject and we feel assured will meet, as its previous editions did, with a cordial reception from surgeons.

C. B. L.

SCLERO-CORNEAL TREPHINING IN THE OPERATIVE TREATMENT OF GLAUCOMA. By R. H. Elliott, M.D.Lond., F.R.C.S.Eng., &c., Lieutenant-Colonel I.M.S., Superintendent of the Government Ophthalmic Hospital, Madras, &c. London: Geo. Pulman and Sons, Ltd. Pp. xviii and 117. Price 7s. 6d. net.

This small volume of 113 pages is of special interest to officers stationed in India where there is such a large field for operative eye-work. Readers of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS are already familiar with Colonel Elliott's operation of sclero-corneal trephining, as an admirable description of it was given by Major Hime, R.A.M.C., in the November issue of last year.

The volume opens with an interesting historical account of the operative treatment of glaucoma, and shows how the operation of iridectomy, introduced fifty years ago by the great oculist, von Graefe, has been practically superseded by the various types of the operation known as sclerectomy. All the varieties of this operation aim at obtaining an iris-free filtering cicatrix, and Colonel Elliott claims that his operation—viz., trephining at the corneo-scleral junction—is the ideal one, and that it is the easiest to perform and the safest.

Colonel Elliott trephines in all cases of glaucoma, acute, subacute and chronic, primary or secondary, with one exception, viz., in the presence of a cataractous lens of semi-fluid consistence. In these circumstances, a very rare condition, he performs an iridectomy.

It is interesting to note that at the Madras Eye Hospital when only one eye is affected by glaucoma, Colonel Elliott not only trephines the glaucomatous eye but also the unaffected eye.

The technique of the operation, the indications for it, and the complications which may arise during and after the operation are most fully and clearly dealt with.

Colonel Elliott has already records of 780 trephinings and the results of the operations, both as regards vision and the lowering of tension, are most encouraging. Perhaps in sclero-corneal trephining we have the operation of the future for the relief of glaucoma. Time alone will tell.

W. R.

PRACTICAL GUIDE TO DISEASES OF THE THROAT, NOSE, AND EAR. By William Lamb, M.D., C.M.Edin., M.R.C.P.Lond. Baillière, Tindall and Cox. 1913. Pp. xvi. and 352. Crown 8vo. Plates 2, figs. 57. Price 7s. 6d. net.

The teaching in this work is up to date, and one feels that the principles laid down throughout are born of sound clinical experience. Subjects on which recent investigation has thrown fresh light are clearly and simply dealt with. Such include oral sepsis and recent operations for chronic antral suppuration. The advice and warnings in the chapter on adenoids are alike valuable. A study of these will assist a doctor to answer correctly that most difficult question, Has my child adenoids, and do they require removal? The important subject of nasal lupus is somewhat cursorily disposed of. It is no small undertaking to deal with the entire subject of the affections of the ear in some ninety pages. This, however, has been accomplished in a very able and simple manner.

The chapters on "Morbid Changes and Danger Signs in Ear Disease"

are excellent, as is also the description of the technique for the performance of the mastoid operations. Fifty-seven suitable illustrations add to the value of the book. Few recent works on these diseases deal with all three regions in one volume. This one does so, a great convenience.

The author's aim to provide a "really helpful guide" to the study of affections of the throat, nose, and ear has been fully accomplished. This little book can be confidently recommended.

G. A. M.

LEHRBUCH DER MILITÄRHYGIENE. Vol. v. (Bibliothek von Coler, von Schjerning, vol. xxxv.) Berlin: August Hirschwald. 1913. Pp. viii and 600. Price 10s.

This volume, which completes the series on military hygiene compiled by eminent German Army surgeons, deals with military statistics. After a short exposition of the history and theory of statistics in general, the author, Professor Schwiening, proceeds to a detailed examination first of the recruiting statistics and then of the health statistics of the various armies of the world. Naturally the German Army takes pride of place, but the statistics give also valuable information about the forces of other countries. The whole is a monument of that careful attention to detail for which German scientific works are now so famous, and anyone interested in the subject can hardly fail to find mines of information in this vast collection of figures and facts. J. A. B.

WITH THE SERVIANS AT THE FRONT (An der Serbischen Front). By Adolf L. Vischer. Bâles: Spittler's Nachfolger. 1913. Pp. 153. $8\frac{3}{4} \times 5\frac{3}{4}$ in. 52 illustrations.

This interesting book is a narrative of the experience of the author, who, as a Swiss Red Cross surgeon, had the good fortune to arrive in Belgrade on October 24 soon after the commencement of hostilities.

On reporting himself to the Chief of the Medical Service, he was told that the battle of Kumanovo had just been fought, and that 1,000 wounded were expected in Belgrade that night; he was asked to take over the military academy, and with the aid of a party of *landsturm* men and of a number of voluntary aid nurses to organize a hospital. About 5 p.m. the wounded began to arrive in cabs and ox-wagons, and were speedily told off to wards. Altogether 304 wounded were received, which kept Vischer and his two assistants fully occupied for thirty-six hours.

On mobilization 250 doctors were taken for service with the Army; this left sixty doctors (including twenty lady doctors) in the whole of Servia. Fortunately assistance soon began to arrive from foreign countries and relieved the medical pressure. Vischer then applied for permission to proceed to Uskub; this was granted largely because his limited equipment did not require much transport. After a tedious journey by train the party arrived at Uskub. Here they were detailed for duty in the partially completed Turkish civil hospital, where a Turkish surgeon of the Red Crescent Society, with a few incompetent assistants, had been endeavouring to treat a number of Turkish and some Servian wounded.

After a short time the majority of the patients were evacuated to Belgrade, and a Servian medical officer took over the management of the

hospital. Vischer applied for and was granted permission to proceed to the front. He joined a bearer company of the Morava division and assisted in dressing the wounded during the battle of Monastir. At the dressing station in the village of Beranze, the procedure was as follows: Each batch of wounded on arrival was taken to a shed where they gave up their arms and their names were entered in a book; they were then taken to the operating tent and their wounds dressed, after which they were accommodated on straw in neighbouring houses. Evacuation was supposed to be carried out by the sick transport column, but as there was only one such column for each division the majority of the wounded had to be transported on ox-wagons requisitioned locally. For several days work continued in the dressing stations. A move was then made into Monastir, where Vischer was placed in charge of an improvised hospital in the Servian school. When this was closed he returned to Uskub, via Salonika, and soon after left for home. There are many interesting observations on the people, their difference in religious matters and on the relative physique of Servian, Turkish and Greek soldiers. The illustrations are very good, and the book is worth reading, as showing the discomforts which a Red Cross surgeon has to put up with in the field. C. E. P.

How to Cut the Drug Bill. By A. H. Hart, M.S. London: John Bale, Sons and Danielsson, Ltd. 1913. Third Edition. Pp. xxxiii and 122. Price 2s. 6d. net.

A review of the second edition will be found in vol. xv of the Journal of the Royal Army Medical Corps, July to December, 1910, pp. 506-7. The third or "National Insurance" edition of this book retains the features of the previous edition, which are mainly the substitution of standardized liquid extracts for the spirits, tinctures and wines of the "British Pharmacopœia," so as to effect a saving in the cost of prescriptions and the use of symbolisms for recording formulæ, and for the entry of credit accounts on a card index system. In this edition particulars are given of a number of proprietary "antiseptics and disinfectants," "invalid foods" and "mineral waters," but the author does not suggest cheaper substitutes for the largely advertised and relatively costly proprietary articles he refers to, which would tend to "cut" the food and disinfectant bill.

The stock mixtures shown in "Section 6, Prescriptions," indicate the ingredients for 1 oz. of a concentrated mixture to which 7 oz. of water have to be added. Immediately under the prescription the dose is stated, but one has to turn to "Section 4" to find out that the concentrated mixture is intended to be diluted one to seven before use. There appears to be some risk in giving the dose for the diluted mixture immediately under the formula for the concentrated mixture.

The author in chapter vi recommends the use of boiling water in the preparation of ammonia liniments. It is not easy to see how economy can be effected by mixing strong liquid ammonia with boiling water.

The book is well printed and contains many useful hints.

J. B. B.

Current Literature.

The Rabbit Test for Syphilis.—Uhlenhuth and Mulzer (*Berlin. klin. Woch.*, April 28, 1913, p. 768) have continued their investigations on the infectivity of the blood and secretions of persons suffering from syphilis; see JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1912, vol. xix, p. 516.

One to two cubic centigrams of the freshly defibrinated blood of the patient are injected into the testicles of a rabbit. In successful cases a small circumscribed nodule forms in the testis from which spirochætes may be obtained; sometimes a diffuse orchitis may be set up. The incubation period varies from 38 to 109 days; the average is 60 days.

The blood of 16 out of 19 persons who were suffering from primary syphilis gave rise to syphilitic lesions when injected into the testis of a rabbit. The blood of 27 out of 36 patients in the secondary stage was found to be infective in a similar manner.

Inoculations with normal blood, with the organism found in Vincent's angina, and with fowl spirilla, caused no abnormality which resembled the syphilitic disease in the rabbit's testis.

The blood serum can convey the infection (two experiments), but it is rendered harmless by passing through a porcelain filter.

Urine (one experiment), sputum (one experiment), cerebrospinal fluid of florid secondary syphilis (seven experiments), cerebrospinal fluid of general paralysis, and tabes (four experiments), all gave negative results when inoculated into the rabbit's testis.

The milk of syphilitic mothers was infective on two out of eight occasions.

The authors observed cell-inclusions similar to those described by Ross as phases of the *Treponema pallidum*, in normal blood when stained by his jelly method. C. B.

Treponema Pallidum in the Brains of General Paralytics.—Marinesco and Minea (*Comptes rendus de la Société de Biologie*, April 11, 1913, p. 709) found treponemata in the pia mater of a man who died of general paralysis ten years after infection.

Marie, Levaditi and Bankowski (*Comptes rendus de la Société de Biologie*, April 19, 1913, p. 795), discovered the *Treponema pallidum* in the brains of two general paralytics out of twenty-four examined. The mental symptoms in one of these cases had been present for seven years.

In a later paper (*Comptes rendus de la Société de Biologie*, May 10, 1913, p. 1009) they state that if each convolution of the brain is examined systematically, treponemata may be detected in the majority of cases of general paralysis. For this purpose the investigation must be conducted within twenty-four hours of death, though they were successful on one occasion forty-eight hours after decease. The pia mater is removed, and fragments of the convolutions, 2 to 3 mm. thick, are emulsified in a few drops of saline fluid on a slide, with which dark ground and Burri preparations are made. They discovered *T. pallidum*

in every one of six cases examined in this way, which had ended fatally in congestive attacks. The spirochætes were often limited to one site; in one brain they were found only in the left occipital region, but the left frontal convolutions were their favourite localities. The subjacent white matter was free from them.

The authors thus formulate the etiology and pathology of general paralysis.

General paralysis is a disease caused by the proliferation of *T. pallidum* in the cerebral cortex, and is due to lesions which this multiplication sets up. The growth of the parasite appears to take place in successive waves, which invade various localities, generally, however, in the anterior portion of the brain. There is a striking analogy between the occurrence of treponema foci in the brain and the periodic syphilides of skin and mucous membranes. In fact, they may be called syphilides of brain, leaving behind them sclerosis equivalent to the induration remaining after healing of a chancre.

As the parasites die out in one spot, they attack a neighbouring area of the convolutions, hence it happens that spirochætes may not be discovered in those parts of the brain in which the microscopical appearances of general paralysis are most marked.

It seems probable that the congestive attacks, or *ictus apoplectiformis*, of general paralytics correspond to outbursts of treponema growth, especially when colonies of parasites are located in the motor areas. Hence it appears that there is a greater chance of finding the *T. pallidum* in the brains of those general paralytics who die with apoplectic symptoms than in others who succumb to some intercurrent disease.

C. B.

A Rapid Method of Colouring the Treponema Pallidum.— Tribondeau (*Bull. de la Soc. française de Derm. et de Syph.*, November, 1912, p. 474) recommends this modification of silver-staining.

Films are dried in the air. They must not be fixed with heat. They are then placed in Huge's fluid, which consists of 1 grm. of pure acetic acid, 20 grm. of formalin, and 100 grm. of distilled water. Pour alcohol, drop by drop, on the slide, drain, and set fire to what remains. Mordant with tannic acid 5 grm. in distilled water 100 grm., heating till steam is given off, and leave for half a minute. Wash with water, and without drying, add some of Fontana's ammoniacal silver nitrate solution, warm till steam ascends, and in half a minute's time wash with water, and dry with blotting-paper. Canada balsam must not be used for mounting, and cedar wood oil must be removed shortly after examination, otherwise fading of the spirochætes ensues.

Fontana's fluid is prepared by dissolving 1 grm. of silver nitrate in 20 grm. of distilled water and dividing into two parts. To one, ammonia is added drop by drop, till a sepia-coloured precipitate forms and then disappears. This portion is mixed slowly with the remainder, when a liquid which remains slightly turbid after shaking is obtained.

The solution is stable and retains its efficacy for months. If the film is too pale, repeat the processes of mordanting and staining.

C. B.

Transactions of the Second Biennial Congress of the Far Eastern Association of Tropical Medicine, held at Hong Kong, 1912.—In the account of Hong Kong which has been compiled by the Editor, Dr. F. Clark, it is stated that only two cases of tuberculosis have been discovered in the native cattle in that city during the last twenty years, though some 35,000 are slaughtered annually and the inspection is very searching; tubercle nevertheless is the cause of 12 per cent of the deaths in the European population, and of nearly the same proportion of the native. Enteric fever is often conveyed by the use of uncooked vegetables and oysters. Pneumonia is common.

Chamberlain and Vedder are of opinion that beri-beri, which is so widely prevalent amongst children in the Philippine Islands, is caused by an improper diet, usually one consisting mainly of highly-milled rice. Noel Davis, on the other hand, thinks that beri-beri is an infectious disease transmitted by parasites, chiefly bugs. V. G. Heiser relates an outbreak of about a dozen cases which could not be attributed to the use of milled rice. Makita finds a considerable increase of lymphocytes and eosinophiles in the blood of beri-beri patients; similar changes occur in the blood of chickens suffering from polyneuritis of fowls induced by a diet of decorticated rice. The administration of ox-spleen tends to restore the blood to its normal condition.

Fraser and Stanton stated that their own work and that of others has confirmed the view that beri-beri is caused by the consumption of overmilled or polished rice, that is rice from which more than the pericarp has been removed. A safe rice will always give more than 0·4 per cent phosphorus pentoxide, a dangerous one less than 0·4 per cent.

Breaudat, of Saigon, said that he had proved experimentally that hand-polished rice if twelve days old produced beri-beri, which could be averted by using rice washings.

Gauducheau, of Hanoi, stated that intestinal and hepatic amœbic infections are the cause of nearly half the deaths of Europeans in Tonkin. He believes that the entamœba of dysentery forms spirochæte-like bodies in culture, and that trichomonas are the flagellate stage of this parasite.

Vedder ascertained that a dilution of 1—100,000 emetin destroys amœbæ of the limax type in culture: fluid extract of ipecacuanha was also lethal in a 1—50,000 dilution, but different extracts varied in this respect. The dysentery bacillus is uninfluenced.

Müller, of Hong-Kong, reported four cases of recovery from dysentery after he had performed appendicostomy. Ashburn, of Manila, stated that this operation had been most extensively employed in his service, but that now it was seldom done; he questioned the necessity of it in Müller's cases.

Teruchi and Hida recommend a 5 per cent casein-trypsin-peptone water for the rapid identification of the cholera vibrio.

Strong and Teague stated that vaccination does not give the same protection against pneumonic as it does against bubonic plague. A suitable mask affords the only reliable safeguard.

Barber has shown that a single plague bacillus is sufficient to kill monkeys and guinea-pigs.

Freer stated that a white cotton shirt and white trousers are sufficient to protect against sunburn and hence against the ultra-violet rays. Many

of the untoward effects of the sun are due to the rapid loss of water, since perspiration is the great factor in controlling the temperature of the body. The issue of a sufficient amount of water to troops on the march in a hot climate is imperative. The ultra-violet rays are not harmful; the ultra-red and heat rays are those which cause ill-effects.

Sarailhé described an epidemic of a fever in Bienhoa, Cochin China, which closely resembles Malta fever. The results of blood culture were not given.

Justi found urobilin in the urine of ninety malaria cases, and in seventy-four cases of infectious diseases, inflammation of the liver and alcoholism. He used Schlesiger's test, which consists in mixing equal parts of urine and a 1 in 10 alcoholic solution of zinc acetate; a few drops of iodine solution are added: the filtered fluid becomes fluorescent if urobilin is present. He thinks that the test for urobilin is as important as the test for albumen and that it should form part of the routine examination of the urine in the Tropics. C. B.

Mosquito Catching in Dwellings.—Orenstein (*American Journal of Public Health*, vol. iii, No. 2) describes the methods used for destroying adult mosquitoes in houses and camps in the Panama Canal Zone. A negro labourer is provided with a small killing bottle containing rubber impregnated with chloroform and with a fly-flapper for use on curtains, screens, &c., where the killing bottle cannot be used. His duty is to hunt for mosquitoes in the early morning, before cleaning up begins, and in the evening, and to destroy all those which he finds. In houses the work is much facilitated by having the walls of a light colour; an electric torch is of great assistance. An additional method is the use of mosquito traps made somewhat on the lines of the ordinary funnel fly trap, a cylinder with two ridges inside it, the apices of which are perforated by longitudinal slits, 3 in. long and ¼ in. wide; these are placed in positions where they are likely to catch mosquitoes entering or leaving the house. It is argued that the most likely mosquitoes to be infected are those found in houses, and the best time to catch them is when they are sluggish and gorged with blood from a recent meal.

The advantages of the method are shown in the malarial incidence among labourers on construction camps; these were located in screened railway trucks surrounded by large areas of breeding ground which it was impossible to deal with at a reasonable cost considering the temporary nature of the camps. Anopheline mosquitoes were caught to the extent of several hundreds in each hut daily. Yet the incidence of malaria in these construction camps was no higher than that in the whole Canal Zone. Unskilled negro mosquito-catchers did quite satisfactory work after a little training. W. S. H.

Anopheles Breeding Areas.—Extract from the "Report of the Department of Sanitation of the Isthmian Canal Commission for the month of January, 1913." *Sanitation. Canal Zone.*—"Some very interesting data have been collected in reference to the increase of adult mosquitoes at Gatun, which was mentioned in the December report.

"The weather conditions on the Atlantic slope and at Gatun have

been somewhat different from those of recent years, and toward the end of the month several showers occurred at a time when continuous dry weather is usually expected.

"As the number of anopheles increased until the number of adults in and about residences at Gatun was very much larger than had ever occurred previously, it appeared that the origin of the sudden influx must have been caused by some new condition that did not exist in other dry seasons. It was evident that such condition must be due to topographical or other changes made since the previous dry season.

"The prominent changes made during the past year were four in number, viz.:—

"(1) The rise of water level in Gatun Lake to elevation plus 55, followed by a collection of vegetable debris along the shore, and the rapid collection and growth of aquatic vegetation. Green algæ did not occur there.

"(2) A hydraulic fill north-east of the town was completed and brackish surface water only partially drained off, leaving but little dead vegetation near the surface.

"(3) The natural drainage of an area north of bridge No. 9, between the old and new Panama railroad locations, had been affected by the silting of ditches in adjacent territory.

"(4) A large fresh-water swamp, west of the French Canal, was being filled by hydraulic dredge, the water used for carrying the mud from present canal channel being sea water.

"All of these areas were beyond the limits of where anopheles control had been found to be essential in previous years.

"In order to determine the source of the unusual anopheles influx all previously controlled areas were very carefully inspected and found to be in satisfactory condition.

"The four areas already mentioned were then examined in the order given above.

"An examination of water in debris along the lake shore showed a few scattered culex larvæ and very few anopheles larvæ. The numerous small fish present were keeping down the number of culex larvæ, but it is thought possible that in time conditions will not be so favourable for the good control now accomplished by the fish.

"An examination in the high vegetation on dry land along shore showed relatively few adult anopheles in daytime and quite a few culicines. The latter did not follow the observers out into the full sunlight.

"Examination made by boat at night along the outer line of aquatic growth, within 50 ft. or less from shore, showed an absence of adult anopheles. This same state of affairs occurred near the shore at a point less than 300 ft. from a row of labourers' cars, where over a hundred adult anopheles were collected early each morning from each car. Moreover, no adult anopheles were found in shade of brush near the cars in the daytime. The lake was therefore temporarily discarded as the possible source of supply.

"The second area, the hydraulic fill north-east of the town, proved to be sterile as a production area, although some of the native huts not far away contained large numbers of ungorged female adult anopheles in the

daytime. This area extends from about 6,000 to 10,000 ft. from the Gatun railroad depot near the lake. It was temporarily discarded as having been a previous important source of the adult anopheles, sufficient to account for the quantity present at the time the observations were made.

"Third, the area north of bridge No. 9, extending from about 6,000 to 10,000 ft. north of the concrete railroad depot, which had been wet, dried up completely while the investigation was being made, and as at that time the anopheles influx was still increasing rapidly it evidently should not be considered.

"The remaining area, west of the French Canal, was next taken up. The inspection thereof was started at its western boundary about 5,000 ft. from the railroad depot. The water there was fresh swamp water with no taste of salt. Anopheles adults were quite numerous. Plenty of water was present and some places looked favourable, but no mosquito larvæ were noted. The north-east end of the swamp was visited next and water there was fresh. Adult anopheles were very numerous, but no larvæ present in water at that point. Adult *Anopheles albimanus* were present on nearly all tree trunks near the ground and in all other suitable resting-places.

"It was decided to start from this point, about 4,500 ft. from the railroad depot, and to wade through the swamp in a general north-westerly direction. At about 200 yards from shore in water about 18 in. deep and thickly overgrown with bunch grass we noted young anopheles larvæ. The water near by was just perceptibly brackish. It was noted that the anopheles larvæ increased as the water became more salty. In the wet area that was decidedly brackish anopheles larvæ and pupæ in all stages of development were noted. It is safe to state that they were more numerous than in any of the places in the Canal Zone that have been encountered since 1904.

"During the eight years of sanitary work on the Zone only one case was recorded where anopheles have bitten a person standing in the full rays of the sun. That occurred at 8 a.m. At the breeding place above mentioned this rule did not hold good, the *A. albimanus* and *A. tarsimaculata* bit quite freely there in the full sunlight at all hours of the day. It is of interest to note that the larvæ were so numerous as to be quite close together. More than twenty-four were noted on one plant leaf 6 in. long. The places where the larvæ and pupæ were most numerous contained from 30 to 75 per cent of sea water. Culex larvæ were relatively scarce.

"In the fringe of brush 300 ft. wide on dry land between the edge of the swamp and the French Canal, anopheles adults were very numerous in the daytime, and at night it was impossible for observers to remain there without being bitten quite frequently during a period of one minute.

"The eastern edge of the swamp is approximately parallel with the present Panama railroad located about 3,000 ft. west of it. The larger part of the settlement at Gatun is east of the Panama railroad, and some portions more than 6,000 ft. from the infected swamp and about west thereof. The prevailing winds blow from north to south and hardly ever from west to east or east to west. There were many more millions

of anopheles coming from the swamp than were necessary to account for the influx at the houses east of the railroad track and more than a mile from the swamp.

"It was necessary to determine at once whether this area was the source of the influx at the settlement. A row-boat containing several men known to be attractive to *A. albimanus* was rowed very slowly up and down the French Canal each night for several nights. The anopheles that came aboard were few in number and not sufficient to account for the large influx at the settlement a mile distant.

"It was assumed that such a large number of adults as would be produced every twenty-four hours at the production area must of necessity spread out or travel a considerable distance in order to get blood sufficient to satisfy them. It was thought within the limits of possibility that they might fly high and not be noted by persons in a boat. It was also assumed that the period of the long flight might be of limited duration. Other factors bearing on the question and previous results noted by specially trained and competent sanitary inspectors of the Canal Zone in connexion with the study of habits of malaria-conveying species of anopheles were given due consideration. It was considered necessary to make several more thorough observations lasting over twenty-four hour periods before drawing any conclusions.

"On January 20, at 4.30 p.m., observers were posted on the opposite side of the French Canal from the propagation area and faced the latter to observe any marked flight that might occur. Previously to 6.20 p.m. practically no mosquitoes were noted. At that time birds of the kind that feed on flying insects appeared to be very active and were apparently feeding on insects in the air, at an elevation of 30 or more feet above the water surface. Later the birds operated at a lower elevation, and at about 6.30 p.m. were feeding at about 6 ft. or less above the water surface. It was at this time that the observers on the bank and in the boat noticed the first appearance of anopheles. The flight was from west to east and quite marked. As it became darker the quantity of flying anopheles increased, and by looking past a dark object against the clear sky hundreds of anopheles could be seen passing by. These observations were continued for four consecutive nights, and the time of the start of the flight period remained about the same. After dark the flight was markedly reduced and practically stopped completely before 9 p.m. Also observers on the east shore of the French Canal were attacked continuously during the period of flight, but failed to find a single anopheles at 9 p.m., although they were very numerous on the west shore near the propagation area.

"It would appear, then, that the *A. albimanus* and *A. tarsimaculata* in the area mentioned oviposit in water that is decidedly brackish, and that the adults fly eastward for long distances between 6 and 8 o'clock. There is relatively little travel after that hour. Adult anopheles were stained with dye and liberated at the swamp. Subsequently, some of them were collected on the opposite side of the river, at the locks and in houses 4,700 ft. from the liberating station. It should be stated that the anopheles' flight was decidedly marked and was easily noted by half a dozen witnesses, when their attention had been drawn to it. Even so, not one person in areas thickly infested did note the flight until shown the way to observe it.

"It is very interesting to note that there is apparently no large or marked return flight to the swamp from east to west. It may be that such occurs, but that it is of a different nature from the direct flight and not yet understood. The most surprising part of the observations made was that the flight did not extend very far beyond the inhabited area where the employees live. It was expected that with thousands of anopheles adults travelling from the swamp to the settlement each night some would go well beyond the settlement in the apparently direct line of flight. Such extension did not occur.

"As the number of anopheles occurring in houses and barracks increased rapidly, more anopheles traps were installed and eight labourers were employed exclusively for destroying mosquitoes in the barracks. Previous to the influx, there were relatively few cases of malaria or anopheles at Gatun.

"The combination of such conditions with the work of the mosquito catchers and use of traps has prevented to a large extent the expected increase of the sick rate at Gatun, as shown by the following figures:—

CASES OF MALARIA REPORTED AT GATUN.

Week ending—	Percentage of total employees
December 7, 1912	1·01
,, 14, ,,	0·61
,, 21, ,,	0·51
,, 28, ,,	0·39
January 4, 1913	0·50
,, 11, ,,	0·41
,, 18, ,,	0·55
,, 25, ,,	0·62
February 1, ,,	0·75

"Apparently up to date millions of adult anopheles have recently occurred near the settlements at Gatun, but, due to the control methods used, there has been no perceptible increase of malaria fever."

Extract from the "Report of the Department of Sanitation of the Isthmian Canal Commission for the month of February, 1913."
Sanitation. Canal Zone.—"In the report for January, data were given concerning the presence of adult anopheles at Gatun. Two large ditches were made to drain the production area referred to and it is now under control. The number of adult anopheles in the settled area has decreased. Toward the end of the present month the prevailing species near the settlement was *Anopheles tarsimaculata.* Very few were noted in the office buildings in the daytime, even though a considerable number were resting in cracks in the ground under such buildings and would bite quite freely there. It should be explained that the buildings are raised several feet or more above the ground surface. No anopheles were found resting in shaded places on the under side of the floor system. Several stained anopheles were found near the breeding area more than two weeks after they had been stained at that locality. It is of interest to note that some of the marked specimens were retaken more than 6,000 ft. from the point where they were liberated.

"The work of destroying adult anopheles in quarters at Gatun, has

been continued daily with gratifying results. The table given below shows the increase of adult anopheles at Gatun, and the corresponding malaria sick-rate. It indicates the value of such auxiliary control work.

Week ending—		Number of adult anopheles destroyed in houses	Malaria cases per week per 1,000 employees	Percentage of employees sick with malaria
October	19	207	2·7	0·27
,,	26	149	3·5	0·35
November	2	199	4·5	0·45
,,	9	404	2·5	0·25
,,	16	666	6·8	0·68
,,	23	779	6·8	0·68
,,	30	3,397	6·1	0·61
December	7	3,150	10·1	1·01
,,	14	3,296	6·1	0·61
,,	21	5,430	5·1	0 51
,,	28	9,415	3·9	0·39
January	4	11,698	5·0	0·50
,,	11	22,074	4·1	0·41
,,	18	22,988	5·5	0·55
,,	25	19,873	6·2	0·62
February	1	15,746	7·5	0·75
,,	8	15,580	8·2	0·82
,,	15	15,676	9·3	0·93
,,	22	11,441	6·8	0·68
March	1	11,234	5·4	0·54

"Observations show that the *A. tarsimaculata* and *A. albimanus* increase when salt water is introduced into the propagation area, and that the number of larvæ of these species is quite large even when the sea-water content exceeds 60 per cent, if other conditions are favourable."

Extract from the "Report of the Department of Sanitation of the Isthmian Canal Commission for the month of March, 1913." *Sanitation. Canal Zone.*—"Additional investigation was made with regard to the anopheles flight mentioned in the January report. It was found that there is marked return flight daily from the village to the production area. The flight of anopheles from the propagation area to the town is quite marked and occurs at present between 6.40 p.m. and 7.10 p.m. The return flight begins at about 6 a.m. and lasts for about half an hour. At no other time of the day or night can any marked flight or return flight be noted. Observations at dusk made at Christobal gave similar results, although the flight was not so marked, due to the more limited propagation area.

"During the period of observations, Mr. E. F. Quimby conceived the idea of using an apparatus for registering the direction of flight of anopheles, with a view to determining the direction of and area covered by flight. It consists of four glass plates set in a metal frame. The frame is mounted on a tripod. The plates of glass are held stationary in two vertical planes at right angles to each other. The instrument can be set up so that the plates point north, south, east and west. The glass plates were painted with a mixture of resin and castor oil, which gave a practically transparent coating capable of holding any mosquitoes that

came into contact with it. It was made by heating castor oil thoroughly and then adding pulverized resin in small quantities, stirring constantly while adding. The proportions used were a half pound of resin to a litre of oil. The instrument was used and the results obtained checked with results of personal observations. It is possible that where antimalaria work is to be taken up in badly infested regions observations of flight in connexion with the apparatus will indicate which of several production areas is the principal source of the particular species of mosquito that it is desirable to eradicate. A distant source of anopheles may cause more anopheles to reach a settlement than all the near-by ones together. Also it may occur that there are several possible sources and it is essential that the actual source or sources receive attention and that unnecessary work be not done in other areas which do not produce anopheles that reach the settlement.

"The destruction of adult mosquitoes at Gatun, in buildings, is being vigorously kept up, and under a few buildings large numbers of *Anopheles tarsimaculata* are destroyed daily. Under one building, fairly well exposed to the wind, 1,648 females were taken in five days.

"At the small villages of Monte Lirio and Frijoles and adjacent construction camps, where no attempt is made to control the near-by extensive anopheles production areas, every building is examined daily for adult anopheles. About 5,000 per week are destroyed. Several hundred employees live along this area, known as the relocation. During January, February, and March of 1913, only two cases of malaria were reported. During the same period of the previous year, when a thorough daily catch was not made, 198 cases occurred."

Experiences in the Balkan Campaign.—Professor Clairmont (*Wien. klin. Woch.*, No. 16, 1913) gave a lecture to the K.k. Gesellschaft der Aerzte on his experience with an Austrian Red Cross unit sent to assist the Bulgarians.

During the first stage of the war the wounded from the First and Third Armies had to be conveyed over seventy-five miles of bad roads through the mountains. The journey was performed in ox wagons, and required six to eight days, during which time it was impossible to give the wounded proper attention or food. Wounded from the siege of Adrianople were evacuated by rail; those from the fighting at the Chataldje lines were sent by rail to Demotika, then by road, latterly in motor-cars, to Karagatsch, whence the railway was open to Sofia.

When his party was travelling to Kirk Kilisse the ox wagons could only travel at the rate of one mile an hour.

In Kirk Kilisse the Greek High School was fitted up as a hospital of 150 beds, although it frequently had to accommodate many more than this number. The clothing of wounded was full of body lice. Water was very scarce and the artificial illumination primitive; when operating after dark a lamp, borrowed from the proprietor of a Greek café, was used with success. Only four gallons of milk daily were procurable for 3,000 patients.

Wounds which soon after their infliction had been dressed with tincture of iodine ran a favourable course.

When dressing wounds no water was employed for cleansing the

parts; alcohol or benzine was used instead. Dressing materials were not touched with the fingers, but placed in position by using forceps. When dressing a large number of wounds, many of them septic, it is impossible to sterilize the hands between each dressing, but instruments can be rapidly sterilized by heat. Mastisol was useful in keeping the dressings in position.

The improvement which took place in twenty-four to forty-eight hours after admission to hospital was astonishing. Limbs which it seemed hopeless to attempt to save quickly became healthy. Clairmont strongly recommends that a decision to amputate should not be made until the patient has been examined on two consecutive days.

Rubber gloves proved most useful and by protecting the hands from infection enabled the surgeon to treat both septic cases and uninfected ones without conveying infection from one to the other, it would have been quite impossible to sterilize the hands thoroughly after touching a septic case; rubber gloves were changed and the soiled pair disinfected with 1 in 1,000 perchloride of mercury solution. If the mercurial solution is left in the gloves the operator may in time absorb a certain amount of mercury, leading to mild mercurial poisoning, e.g., diarrhœa.

Local anæsthesia proved most useful in trimming operations. As almost all the cases were infected it was considered too risky to employ spinal analgesia.

As regards wounds of different regions of the body, the prognosis of wounds of the head is extremely bad, as almost every one becomes infected. Tangential and gutter fractures and also segmental wounds should be explored and loose splinters removed at the earliest opportunity, but care must be taken not to remove too much bone, as this may lead to the formation of a hernia. In transverse wounds of the brain, it is permissible to delay operative treatment. It is extremely difficult to find and remove all the spicules of bone which are driven into the substance of the brain.

Wounds of the bladder healed up without giving rise to any complication.

Clairmont lays down the following axioms:—

The aim of military surgery in the field should be to prevent sepsis at all costs. This endeavour should begin immediately after the wound is inflicted. The correct use of the first field dressing is all important. No dressing at all is better than a dirty one applied by dirty fingers. What is required in the field is a large number of men specially trained in the dressing of wounds; there is comparatively little need for specialist operating surgeons.

Trained nurses must be forthcoming in sufficient numbers for military hospitals; voluntary aid nurses with only a superficial training, with no idea of discipline, full of curiosity, but unwilling to undertake an unpleasant duty, are of no use in a military hospital. C. E. P.

Gunshot Wounds—Balkan Campaign.—Le Fort (*Archiv Méd. Pharm. Milit.*, May, 1913) contributed an article from notes supplied by Dr. Solon Veras on the medical arrangements with the Montenegrin troops and the wounds treated in the French Red Cross hospital.

In February there were about 100 cases of typhoid fever under treatment at Podgoritza.

The age of the wounded varied from 15 to 69 years; older men when wounded did not recover so rapidly.

Three gunshot wounds of the head were particularly interesting. The first was a man aged 40 who was wounded in the left fronto-parietal region; the bullet penetrated the skull, and emerged in the fronto-parietal region of the same side. On admission he was in a semi-comatose condition. The wound healed up in a few days and all the symptoms cleared up. He was discharged cured in twenty-five days.

The second case was a man aged 45 who was hit in the right fronto-parietal region. He arrived in a comatose condition with paralysis of all his limbs and incontinence of urine and fæces. On the day of admission his temperature was 102° F.; soon afterwards it fell to 100° F. He remained in this condition for several days; his condition then began to improve. The wound did not suppurate, and as the bullet did not apparently give rise to any symptoms, no attempt was made to extract it. When discharged, the only disability was a slight paresis of the left arm.

The third case was that of a woman aged 25 who had gone to visit her husband. The bullet entered in the frontal region, traversed the brain and made its exit in the occipital region. She was admitted to the hospital in a comatose condition with incontinence of urine and fæces. Slight pyrexia was present for a few days, after which all the symptoms began to clear up. At first she was in a condition of mental stupor; this slowly disappeared, and at the end of a month when discharged from hospital she could give a sensible answer to a simple question.

From these and other cases Veras concludes that wounds of the head need not prove fatal provided hæmorrhage or sepsis does not occur.

C. E. P.

Balkan Campaign.—Heuyer (*Le Caducée*, April 19, 1913) has published some notes of his work in an auxiliary hospital at Philippopolis. The Bulgarian army medical service was badly organized and equipped. There were too few stretcher-bearers and no proper system of collecting or evacuating wounded. The field ambulances were frequently as much as four miles in rear of the fighting line, and the wounded in many cases did not know where they were situated. The death-rate among the wounded was very high; at Bunar-Hissar there were 4,000 wounded, of these only about 1,000 were evacuated and recovered. Around Adrianople the medical arrangements were better.

Men wounded in the various battles were mainly evacuated on ox wagons, lying on straw; the journey to a stationary hospital or ambulance train lasted in some cases six days. During this time the wounded were fed, but their wounds were not redressed. A large number of wounded were carried on men's backs across the Rhodope mountains. The Bulgarian army medical service had no ambulance trains; after the conclusion of the armistice two ambulance trains were lent by the Servians.

At Philippopolis there were several foreign ambulances which at first were by no means fully utilized, as the general staff had ordered all wounded to be evacuated to Sofia. Heuyer's hospital received two categories of wounded—those from the battles at Lule Bourgas and at Chataldja, and those from the siege of Adrianople. The former had

been transported for days in ox wagons without any medical attention; their wounds were suppurating and the patients were utterly exhausted. After being admitted to hospital and attended to they made a rapid recovery. Patients received from Adrianople within thirty-six hours of being wounded were in a grave condition, showing all the signs of severe septicæmia. Nearly all the wounds were gangrenous, irrespective of the time which had elapsed between the receipt of the wound and the application of the first field dressing, which was an aseptic one. No cases of abdominal wound reached the hospital. Heuyer saw five penetrating wounds of the thorax; all of them arrived with hæmothorax; the effusion became organized and after aspirating the serum they all recovered. He remarks, however, that these five were probably only a very small portion of the number wounded in the chest. In treating suppurating wounds the best results were obtained by using tincture of iodine and very hot water.

Heuyer recommends the employment of an antiseptic first field dressing and the application of tincture of iodine to the wound and surrounding skin; also that the dressing should contain a liberal quantity of cotton wool, as this substance is the best preventive of subsequent infection. C. E. P.

Austrian Red Cross Society and the Balkan War (*Das Rote Kreuz*, No. 2, April 15, 1913).—A meeting of the Society was held in Vienna to receive reports from medical officers who had been employed by the Society during the Balkan War, and especially to discuss their criticisms of the equipment sent out with them.

The statistical returns have not been fully worked out, but the total number of patients treated in the Society's units was 871 sick, and 3,125 wounded; of the latter from 27 to 50 per cent were septic. Among the sick in Constantinople were 100 cholera cases, of which forty died. Professor Clairmont, in discussing the organization of a hospital, said it was of great importance to separate the severe from the slight cases, as this lessened the nursing work.

First Field Dressings.—Among the Montenegrins a certain number of Russian first field dressings were employed. These were strongly impregnated with perchloride of mercury; tincture of iodine (10 per cent) was lavishly used on the skin. The result was to produce severe wound eczema.

The general opinion was that 5 per cent tincture of iodine should be supplied for use in the field; that the first field dressing should be composed of aseptic material without the addition of antiseptics; and that Mastisol is most useful in dressing wounds which have not become septic.

Rubber Gloves.—Everyone was in favour of using rubber gloves when dressing wounds in the field, on account of the ease with which they can be cleaned. The difficulty is to keep a sufficient quantity of them in store without undergoing deterioration.

Absorbent gauze was generally agreed to be the best material for dressings, while muslin bandages were for most cases preferred to calico ones. All the surgeons stated that in order to satisfy the patient they frequently had to redress wounds before this was actually necessary.

Plaster-of-Paris was invaluable in cases of fracture of the bones of the lower extremity.

Instruments in Field Hospitals.—An elaborate equipment of surgical instruments is not necessary, but there should be an ample supply of forceps with which to handle dressings.

Serums.—It was not at present possible to give a definite opinion as to the value of cholera and typhoid serum, although the former seemed to have a good result in some cases treated in Constantinople. Anti-tetanus serum proved useless in all cases. C. E. P.

Balkan Campaign—Austrian Red Cross Society in Montenegro.—Oberstabsarzt Dr. J. Steiner (*Das Rote Kreuz*, April 15, 1913), who was employed by the Austrian Red Cross Society to supervise the Society's establishments in Montenegro, has published a short account of his experiences. During his contact with Montenegrin soldiery he noticed that discipline as understood in European armies hardly existed; soldiers and officers messed together; the men acted mainly on their own initiative and insisted on taking part in any fight going on.

In peace time the country is divided into four divisional districts which on mobilization furnish four divisions, but no cavalry. The supply service was only organized on the outbreak of war and comprised the men not fully physically fit for combatant units and the older men of the reserve. A large part of the supply service on the lines of communication was carried out by women, who drove carts and pack animals, and even—in accordance with their ancient customs—penetrated to the fighting line to bring food and ammunition to their relatives.

The field medical organization was primitive to a degree. Each division had one medical officer. Each battalion had one "sanitar," i.e., a soldier who had received some elementary training in first-aid work. There were no medical units. Most of the men had been supplied with Russian first field dressings. In Cettigne there was a modern hospital of sixty beds with a skilled surgeon. All other medical arrangements had to be improvised or were supplied by foreign Red Cross Societies. A Montenegrin Red Cross Society exists, but does not appear to have made any preparations for war.

Steiner arrived in Cettigne on October 19; at that time there were 260 severely wounded in Cettigne and 500 in Podgoritza without proper medical care. With the sanction of the Montenegrin Government and with the approval of the Montenegrin Red Cross Society, Steiner decided to establish the Austrian Red Cross Field Hospital in Podgoritza. He selected the empty gymnasium (high school), which could accommodate eighty patients; the school fittings were found most useful as improvised equipment for the hospital, a wooden kitchen was built in the yard. He then set to work to collect fuel, straw for beds and food-stuffs. The personnel arrived on October 27, and as soon as the equipment was unpacked was able to begin work.

The Austrian field ambulance was sent temporarily to Tuzi to attend to seventy-eight severely wounded Turks who were in urgent need of assistance. It was then moved to Plavnitza, on Lake Scutari, and acted as a rest station for convoys of wounded being transhipped across the lake. Plavnitza is a small hamlet, situated in swampy ground about half a mile

from the edge of the lake, and is anything but ideal for the site of a field ambulance. The unit did good service here, both for sick and wounded of the army and for the surrounding civil population. C. E. P.

The Bulgarian Medical Service in the Balkan Campaign, 1912-13. —Stabsarzt, Dr. Lotsch (*Deutsch. Militär. Zeit.*, May 5, 1913) gave a lecture on the Bulgarian army medical service based on his observations while employed as a surgical specialist during the war.

He began by reviewing the conditions of military service in the Bulgarian army and especially remarked on the splendid soldierly material afforded by the recruits.

The equipment was much the same as that of other European armies except that most men wore the national foot-covering instead of boots. This consists of a woollen cloth wound round the feet and legs, with leather sandals fastened with thongs. Lotsch never heard of any cases of foot soreness among the men wearing this dress.

The peace strength of the Bulgarian army is roughly 60,000 men, organized in nine divisions of two brigades each; in war each division had three brigades and each brigade had eight battalions of 1,000 men in each. Each division had a strength of 25,000 men. When war was declared the combatant strength of the army must have been roughly 320,000 men. According to some estimates the total number of men mobilized, including non-combatants, was 400,000. The total losses up to the conclusion of the first armistice were roughly 80,000 men.

The army as a whole was thoroughly prepared for war, but the medical service was lamentably deficient in many important points. Many combatant units only had half the number of medical officers on their establishment.

The composition of field medical units is not definitely known. The first division had four whole and two half ambulances, the composition of which was somewhat as follows:—

	I. Half	II. Half	III. Whole	IV. Whole	V. Whole	VI. Whole
Senior medical officer ..	1	1	1	1	1	1
Medical officers in charge of sections	1	1	2	2	1	2
Intendant..	2	1	1	1	1	1
Pharmacist	1	1	1	1	1	1
Paymaster	1	1	1	1	1	1
Soldiers	106	105	94	96	?	115
Ox wagons	31	28	30	35	30	35
Horsed wagons	3	4	2	1	2	3

The half ambulances appear to have been employed with the cavalry and artillery. The 5th and 6th ambulances of the 10th Division had only one medical officer each.

Reports as to the hospital accommodation for the troops in the field gave widely different estimates; according to the regulations, hospital accommodation for 10 per cent of the strength should have been provided. A number of unopened Turkish field hospitals were captured at Kirk Kilisse.

Each infantry regiment of four battalions was supposed to have four ambulance and two medical stores wagons, but in many cases only one of the latter was supplied. The regimental medical officers established dressing stations 2 to 3 km. (1¼ to 2 miles) behind the firing line; the field hospitals were located 10 km. (about 6 miles) further to the rear, in buildings where possible, otherwise in tents.

On mobilization first field dressings were not issued; later on a certain number of these were supplied, but the men did not know how to use them. Twenty-three of the regiments never received any first field dressings; only three had one dressing for each man, in the remaining ten regiments the percentage of dressings supplied varied from fifty to something like five.

The dressings found on wounded evacuated to the lines of communication showed a great variety in material as well as in the method of application. The immobilization of fractures was not thoroughly carried out. Owing to the absence of wound tallies the dressings had to be taken off and reapplied at every halting place. The Bulgarian stretcher is a good one of simple construction, the number provided is not known. The horsed ambulance wagons could not be employed on the muddy tracks; ten motor ambulance wagons were used on the better roads. The country ox-drawn wagons constituted the chief means of evacuation. On the soft, muddy tracks they could not be relied on to do more than 10 miles a day; unfortunately, the floor space is limited and really only affords room for one lying-down man. Owing to the scarcity of straw the wounded in many cases lay on the floor.

Bulgaria had no ambulance trains of any kind; most of the wounded were simply placed on the floors of goods wagons, from thirty-two to forty in each; no straw was supplied. In many instances slightly wounded men were transported on the roofs of the wagons. There was no communication between the wagons, so that medical assistance could not have been given to the patients during the journey; no medical officer was sent with the train. The wounded were not classified according to the nature of their disability and the convoys always arrived at their destination after dark; this led to great confusion when assigning patients to different divisions in the hospitals.

The medical arrangements for evacuating sick and wounded were made by a commission composed of one officer and two civilian practitioners. At first Jamboli was the main station for the evacuation of sick and wounded; later on Lozengrad (Kirk Kilisse) took its place. The evacuation hospitals in both places were improvised in barracks and schools, were poorly equipped, dirty, and very short of personnel. Fresh batches of wounded arrived without any warning, while those to be evacuated always had to wait hours before the train was ready. Many men who were really fit to return to their units were evacuated to the home territory.

A refreshment station was established in the old Turkish barracks in Kirk Kilisse; here as many as 4,000 to 6,000 slightly wounded were accommodated and fed at one time. In the different hospitals, Bulgarian and foreign Red Cross Societies, some 2,000 wounded were treated, while another 2,000 were billeted on the inhabitants.

The Turkish garrison hospital is a modern building on the German

army hospital model. The main drain had collapsed, which led to a constant overflow in the latrines; water had not yet been laid on. The surroundings were, owing to the want of any supervision, always in a filthy condition. Most of the equipment was of German origin. Artificial lighting was not provided, which greatly restricted operative work.

A hospital of 200 beds for infectious cases was established at a later period. Typhoid fever generally ran a mild course, with great enlargement of the spleen and a copious eruption almost like that of measles. Cholera when it first appeared only caused a mortality of 7 to 10 per cent; at a later period the mortality rose to 50 per cent.

Lotsch gives a list of the hospitals in Sofia, with a short description of each; nearly all of them were under the charge of foreign Red Cross units. C. E. P.

Correspondence.

THE MEDICAL PROBLEM OF THE MOBILIZED TERRITORIAL FORCE.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—I have just read with much interest Major E. B. Waggett's lecture on the Medical Problem of the Mobilized Territorial Force as reported in the Journal of the Royal Army Medical Corps for July, and having had five years' experience of Territorial work I would like to make a few remarks upon it.

Major Waggett, in his paper at any rate, seems somewhat of a pessimist, tending to over-rate the disadvantages and under-rate the advantages which the Territorial Medical Officer has in dealing with the problems he sets forth.

First, he states that the T.F. Medical Officer can only get fourteen days' training in the year. One is accustomed to hear this from newspapers, but not from Territorials themselves, who know that training of one sort or another goes on all the year round. Does Major Waggett receive no invitations to staff-tours or rides, or to regimental parades and field days? Does he train no stretcher-bearers, give no sanitary lectures, attend no week-end camps? All these things are training over and above the fifteen-day camp. He does not notice the enormous advantage enjoyed by the R.A.M.C. (T.F.) in belonging to field ambulances which exist as definite units in peace-time, and are not merely made up on the outbreak of war—an advantage which should, and in most cases I believe does, make them fit to take the field immediately on mobilization.

Major Waggett seems still to hold the ancient idea that the M.O. is a voice crying in the wilderness without support or assistance from his

colleagues, surrounded by apathetic combatants and exposed to a limelight of Press criticism. The S.M.O. at Slough, to take the example he puts forward, if he could not run his own show, would apply to his A.D.M.S. for assistance. In any case the A.D.M.S. would have helped him at the outset with instructions and orders as to the general care of troops in billets. The billeting problem will not be a difficult one as the troops will be placed in schools and public buildings which have long been surveyed for the purpose, and their accommodation ascertained and registered, and even the amount of extra latrines and ablution benches required carefully noted. To see that there is no overcrowding, and that the ordinary rules of cleanliness and sanitation are enforced, and to pick out and isolate every kind of disease which is in the least suspicious, should not be difficult under these circumstances.

These remarks apply very much also to camps. If these are formed, which is doubtful, they would be placed on carefully chosen sites with good water supply, and if by this time every Territorial unit has not become capable of carrying out camp sanitation—possibly with a little advice and supervision at the start—it can only be due to defective instruction by the medical authorities. At any rate the G.O.C. of the division at the outset of the camp would publish strict orders drawn up by his A.D.M.S., and the S.M.O. of the brigade would see they were carried out.

Major Waggett scores a point when he alludes to the indisposition of the authorities to allow the grounds to be trenched, and much valuable instruction in camp sanitation is lost in consequence.

At a certain village two years ago which was selected for a camp site, I condemned the local water supply and laid down certain stringent precautions which were punctually observed by the T.F. troops, and will be equally well observed this year. This points to good discipline and the intelligent appreciation of the dangers of village water. Water discipline among manœuvring troops is a matter for the C.O. and not for the sanitary officer, but it may be observed that T.F. regiments have no filter water-carts, so it will resolve itself into cold tea and clean water-bottles.

"Foot" parades would be more frequently held if the S.M.O. would ask his Brigadier to put them in brigade orders. In the same way if the C.O. of a battalion (not as Major Waggett puts it, the colonel of a regiment) does not take his M.O's advice, then the S.M.O. must invoke the Brigadier's authority to make him do so. Major Waggett I am sure knows all this, but he is so haunted by "the medical voice crying in the wilderness."

The town Territorial is "soft" for the first few days, but soon hardens, and most of the "gastro-enteritis" is, I think, a familiar camp diarrhœa, due to change of habits and diet, which soon passes off. It is doubtful

how many men would volunteer for antityphoid inoculation, few I fear until an outbreak took place. Smallpox, we all agree with Major Waggett, is a serious problem, but there would be few men who would decline re-vaccination after mobilization had taken place. To sum up, I think Major Waggett would allow that the sanitary problem is much simpler in a temperate than in a tropical country, that pure water supplies would be available at most war stations in places of concentration of Territorials, at any rate during the mobilization stage—which he thinks will last for months—and he must admit that what with the initial courses and examinations, and promotion courses and examinations, staff-tours and local camps, and so forth, a M.O. of any energy has great opportunities of learning military sanitation as well as his other duties, and that in his sanitary work he will have the entire support of his A.D.M.S., and of the specialist sanitary officer of the division who is a M.O.H. engaged in active practice, and therefore one who has almost certainly had actual experience in checking outbreaks of epidemic disease in England.

Finally, if the combatant officers do not believe in sanitation, it lies with Major Waggett and his medical *confrères* to interest and instruct them in the subject. It is not a difficult thing to do and has often been done successfully.

I am, &c.,
E. C. FREEMAN,
Major R.A.M.C. (Retired Pay.)

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Original Communications.

A PRELIMINARY REPORT ON THE TREATMENT OF HUMAN TRYPANOSOMIASIS AND YAWS WITH METALLIC ANTIMONY (PLIMMER).[1]

BY CAPTAIN H. S. RANKEN.
Royal Army Medical Corps.

ANTIMONY was demonstrated by Plimmer [1] to be an effective trypanocide, and in the form of its salts has been used as a therapeutic agent both in sleeping sickness in man and in experimental trypanosomal infections in animals. Kerandel [2] reports the cure of his own case by intravenous injections of tartar emetic, and other cases recorded by Manson [3] and by Broden and Rodhain [4] have been benefited. Plimmer, J. D. Thomson, Bateman and Fry [5] report successful results with various animals.

The drug was prepared in metallic form by Dr. R. H. Aders Plimmer for H. G. Plimmer, F.R.S., and reports [6] have been published on its use in animal infections. In the first instance attempts were made to administer it by subcutaneous and intramuscular injection, and several vehicles were experimented with. Suspensions in various oily media, including Lambkin's cream, proved unsatisfactory owing to the severe irritating effect of antimony on the tissues. Egg yolk had to be discarded for the

[1] The substance of this paper was published in the *Proceedings of the Royal Society*, B, vol. lxxxvi, 1913.

same reason. Finally, it was found possible to inject the drug intravenously in its particular condition as a suspension in physiological saline solution without any untoward effects—local or general. By this method many animals were cured of trypanosomal infections by Plimmer, Fry and Ranken [6]; and in May, 1910, Major Fry gave an intravenous injection to a late case of kala-azar and thus demonstrated that the treatment was applicable to man.

The cure of a case of sleeping sickness has been reported by Camac [7]; intramuscular injections of metallic antimony were given, but the pain following these injections was so severe that the method had to be abandoned. Captain R. J. C. Thompson, R.A.M.C., gave this preparation by intravenous injection to the cases first admitted to the Yei Sleeping Sickness Camp, between January and March, 1911. Eighty-one injections were given to thirty-eight cases, but pressure of administrative work prevented these cases being fully treated and investigated, and they were all subsequently treated with atoxyl. Captain Thompson states that from a clinical standpoint some of these cases showed great improvement.

Later I had the honour of being appointed to the Sudan Sleeping Sickness Commission for work in the Yei River District in the Lado Enclave, and since October, 1911, I have collected a series of cases treated with metallic antimony alone and in conjunction with other drugs, but this report must be, in the literal sense of the word, preliminary. Only a year has elapsed since the first of the cases was treated, and many of the later ones have just completed their course of treatment; but it is hoped to demonstrate that antimony in this form is a safe drug to employ in the treatment of sleeping sickness, if used with reasonable precautions, and that the results obtained so far certainly call for extended use and further investigation.

During the past year seventy-six newly admitted cases have been treated, either with antimony alone or with antimony combined with salvarsan and atoxyl, aud shorter courses have been given to 143 old cases previously treated with atoxyl, atoxylate of mercury, &c. Over 1,400 intravenous injections have been given, and three deaths have occurred which can be attributed to the treatment. All the fatal cases were amongst the first 150 injections.

The method of administration is the same as that of an ordinary intravenous injection of saline solution given hydrostatically. The apparatus used has been one funnel (or cylinder) of the Holborn

Surgical Instrument Company's salvarsan apparatus with 3 ft. of rubber tubing and one glass "window"; whenever possible a needle has been used of larger bore than the "record" needle supplied by this firm for the intravenous injection of salvarsan. The actual bore of the needle is No. 19 standard wire gauge and the outside measurement of the needle is No. 15 on the same scale.

The dose of antimony is stirred with about half an ounce of normal saline in a small glass mortar and becomes a temporary suspension. Two ounces of saline are then poured into the funnel and tubing, the needle is inserted into any vein in the forearm and the clip opened. As soon as it is seen that the saline is flowing freely into the vein and there is no swelling round the site of puncture, the suspension of antimony is poured into the funnel and the mortar is washed out, with a little more saline, into the funnel in order to leave no residue. The antimony is allowed to run into the vein, the funnel being gently shaken from time to time, and when it is on the point of becoming empty more saline is poured in. The window in the rubber tubing should be watched, and after all traces of antimony have passed it some more saline is allowed to run in to clear the antimony out of the part of the tubing below the window; the clip is then closed and the needle withdrawn. About 6 oz. of saline solution seems to be a sufficient quantity, and the time occupied in giving an injection varies from three to seven minutes—depending on the calibre of the vein and the bore of the needle employed. The apparatus works well and the antimony goes into the vein easily and completely if a large needle is used, but with a small needle and slower delivery the fine powder tends to collect on any protrusion in the lumen of the rubber-tubing—*e.g.*, on the upper end of the glass tubing used as a window, and at the metal junction for attachment of the needle. A modification will be made which will prevent this to some extent, but it can be guarded against by gently kneading or pinching the tube at any site where such deposit may occur.

A small local induration at the site of injection has been seen occasionally, and there have been a few small abscesses. Only two cases of severe suppuration have occurred; both were near the bend of the elbow and in both, I think, there was some escape through a wound on the deep side of the vein. Antimony free in the tissues is extremely irritating, and causes acute suppuration and sloughing. It is essential to guard against escape of fluid around the vein, and to withdraw the needle on the appearance of the slightest swelling.

Our method has been to have several cases waiting with a puttee wrapped tightly round the upper arm; they spend the few minutes before their turn forcibly flexing and extending the arm to render the veins prominent. One native assistant attends to this, another prepares the skin by painting tincture of iodine over a suitable vein, while a third boils spare needles and others assist in the actual administration—holding the funnel, &c. This technique enables an operator to give ten injections in an hour. There were two men giving injections at the same time, one on either side of the table, and frequently forty cases were treated before breakfast. This is mentioned to show that the treatment is feasible on a large scale. Elastic webbing would be still better than a puttee for applying to the arm, but it perishes in a warm climate.

Dosage.—The usual dose is 1 gr. Larger doses up to 3 gr. have been given, but these seem to be attended with some risk and have been given up for the present. It is probable, however, that in good selected cases 1½ gr., or even 2 gr., may be safely given. Several cases of definite idiosyncrasy have been met with, however, so that the initial dose should be 1 gr. The interval between the doses seems to be of the greatest importance. Four days would seem to be most suitable, but injections have frequently been repeated on the third day after a dose; they should certainly not be postponed any later than the fifth day. A few of the earlier cases were treated with weekly doses; two of these showed an idiosyncrasy and were unable to take doses at shorter intervals; both cases have relapsed.

The usual course of treatment has been five doses at intervals of four days, covering a period of from seventeen to twenty days, and after an interval of six weeks a short course of three doses at the same interval of four days and covering a period of nine days. The method of treatment had to be introduced gradually and very cautiously. An intravenous injection is more impressive than a mere subcutaneous injection and is more apt to inspire fear. Attempts to push this treatment at the outset would probably have led to desertions, and in this district with fly practically everywhere desertions must lead to dissemination of the disease. The patients are now quite accustomed to the treatment and in no wise alarmed by it. It is, therefore, possible to proceed more freely and it is proposed to shorten the intervals between the courses and extend the second course to five doses.

Series of Cases.

The seventy-six previously untreated cases have been divided into three series according to the treatment they have been given.

(1) Antimony alone.

(2) Antimony and salvarsan.

(3) Antimony and atoxyl.

The first series had the course of treatment just described and the methods adopted for the second and third will be dealt with later under their separate headings.

These three series will now be considered :—

(1) *Antimony Series.*

Thirty-five cases have been treated with antimony alone. In fifteen of these there were no symptoms except enlargement of the cervical glands. The following table gives the additional symptoms met with in the other cases. In addition to the symptoms detailed the majority showed debility of varying severity :—

Symptom	Number of cases in which each symptom was noted
General tremor	3
Tremor of tongue	17
,, fingers or hands	4
Œdema of eyelids	5
Cough	2
Pains in joints	1
Difficulty in walking	2
Apathy, mental dullness	4
Mental symptoms	1

From this list it will be seen that the cases were not specially selected for treatment; had such a course been adopted there would have been relatively little material.

The results will now be summarized :—

Up to the present date it has not been possible to procure susceptible animals for inoculation from the cases treated, so microscopical examination has been the only available method of controlling the results. Blood and gland juice have been examined in all cases. The usual method of blood exanimation was as follows: Three observers take a drop of blood as a wet preparation and examine it for ten minutes; this is repeated twice, so that nine drops of blood are examined, or a total of one and a half hours search. This is tedious, but in the absence of susceptible animals for inoculation it was felt desirable to make as thorough an examination as possible. The "Thick Blood Film" method was employed also, but discarded, as trypanosomes were found much more readily in fresh blood.

Of these thirty-five cases four are dead and two have deserted. Trypanosomes have reappeared in the blood of four cases and another has relapsed clinically. The remaining twenty-four have all improved and all microscopical examinations have been negative.

(*a*) *Deaths.*—Two only of the four deaths can be connected directly with the treatment. Both were advanced cases and had been given larger doses than usual. No. 2, a boy aged 10, had 2 gr. on one occasion and 1½ gr. twice. He showed no symptoms till forty-eight hours after the last dose, when meteorism appeared, accompanied by acute abdominal pain, and he died seven hours later. Abdominal pain and nausea have been reported as occurring soon after the injection of salts of antimony, but in this case there was a clear interval of forty-eight hours.

A somewhat similar death occurred quite unconnected with treatment, in a case which had been treated with atoxyl only. No. 24 was also an advanced case; he took two injections of 1 gr. without discomfort and then had a dose of 2 gr. Twelve hours later epileptiform symptoms set in quite suddenly; the patient became unconscious and died six hours later.

Of the other two deaths, one, No. 7, was due to broncho-pneumonia; the patient was debilitated and broncho-pneumonia was very prevalent at that time, while the other case, No. 47, died from an epileptiform attack, but had not had any form of treatment for a week.

(*b*) *Deserters.*—One, No. 38, had recently completed his course of treatment and had shown great improvement. The other, No. 3, belonged to a district 100 miles from Yei, and had always been wanting to get away. He had been without treatment for five months, and had done very well, taking large doses without untoward symptoms. All examinations had been negative, though repeated very frequently.

(*c*) *Relapses.*—No. 27 is a clinical relapse. He was a soldier stationed 30 miles from Yei, and his condition on arrival at the camp was alarming. He was unable to walk and was brought in leaning heavily on two men who had supported and assisted him along the road. A full course of antimony in doses of 1 gr. was successfully given, and there was a great improvement in the patient's condition. The large masses of glands were very greatly reduced in size; the tremor was unaffected, but he became much stronger, and was able to act as a "native assistant" in the laboratory, and a "headman" in the camp. His improvement was most striking; it was maintained for three and a half months,

when suddenly he relapsed and became a "third stage" case. Blood examinations were negative. The cerebrospinal fluid was also examined and the cellular elements were found increased, but trypanosomes were not found.

In four other cases trypanosomes have reappeared in the blood. Two of these had an idiosyncrasy with regard to antimony and were unable to take doses at shorter intervals than a week. After the relapse attempts were made to give them another course of antimony, but had to be given up owing to their unusual susceptibility to the drug. The other two had heavy infections, but did not seem to improve. All four have been since treated with atoxyl.

(*d*) The other twenty-four cases have shown improvement. In three it is slight and these are being kept under close observation. In some cases the improvement has been very striking; in others who came into the camp in fairly good condition it has not been so evident, but the whole appearance of the patients is different. After a course of antimony there is not uncommonly depression and debility. This, however, passes off in a few days; the patient becomes more active, feels and looks better, and loses the languor that is so often seen in patients just admitted. They put on weight and the skin becomes healthier. This is no doubt due in part to the regular feeding in the sleeping sickness camp, but the improvement would not occur were it not initiated by the treatment. In some cases the tongue tremor has disappeared under treatment.

These are the results up to the time of writing, but it is quite possible that other cases in this series will relapse. They are being kept under observation, and blood examinations, &c., are frequently made, but further treatment is not being given, as it is felt desirable to watch the ultimate results of this course of treatment.

(2) *Antimony and Salvarsan Series.*

Ten cases have been treated with these two drugs, but a regular course has not been carried out. The salvarsan was given in the majority of cases when a patient was unable to take a complete course of antimony. Thus no information has been obtained as to the best line of treatment to be followed with this combination of drugs, but a further series has been commenced.

The results up to the present are: Eight out of the ten cases are very well and have shown definite improvement; one deserted,

but was in very good health, and had been without treatment for four months. She was one of the few who had a complete course. The tenth case had one injection of salvarsan, and was unable to take antimony treatment on account of extreme susceptibility. Atoxyl was substituted, but the patient developed toxic symptoms. She is now having small doses of atoxyl, but is getting steadily worse.

The salvarsan has been given both as an intramuscular injection in olive oil, and by intravenous injection in alkaline solution.

(3) *Antimony and Atoxyl Series.*

The patients in this series have been treated as follows:—

(1) Five doses of antimony 1 gr. at intervals of four days.
(2) Atoxyl 5 gr. every three days for forty days.
(3) Three doses of antimony 1 gr. at intervals of four days.
(4) Atoxyl 5 gr. every three days for one month.

There is no interval between these courses; thus the patients have continuous treatment over a period of rather more than three months. An interval of a month is then given and atoxyl treatment is then continued as a tonic and precautionary treatment.

Thirty-one patients have been treated, but three were unable to take the complete course of antimony.

This is the most recent series, and the three months' course has just been completed; it is, therefore, too early to speak of results. At the time of writing all have done well; the improvement in many cases has been striking; some, however, were advanced cases, and it is not expected that the improvement will be maintained permanently.

(4) *Old Atoxyl Cases treated with Short Courses of Antimony.*

After it was seen that intravenous injection of antimony was bringing about improvement in the newly admitted cases, and that the treatment could easily be carried out on a large scale, it was decided to give short courses of antimony to the old cases that had been under treatment with atoxyl, atoxylate of mercury, &c. This was done both to give these cases the benefit of the antimony treatment, and also to interrupt atoxyl treatment and prevent the development of "atoxyl-fast" strains of trypanosomes. The majority of the patients so treated have had two separate courses of three doses of antimony 1 gr. In some instances patients have not had all these six doses on account of hypersusceptibility, inter-

current affections, bronchitis, &c., but 813 injections have been given to 143 patients.

In this series there has been one death. The two fatal cases in the first series had doses which have been found to be inadvisable in advanced cases. In this case, No. 32 A, only two injections of 1 gr. had been given. The patient was a man in good general health; he showed slight depression after the first dose, but had quite recovered, and seemed to be ready for a second dose four days later. He was sick after this injection and felt ill during the day, but next morning, though rather weak, he was going about the camp. The following morning he developed alarming symptoms; he was sick again and complained of faintness. On examination he was found to have a weak running pulse, but he was quite conscious; he did not respond to stimulants and the skin remained cold. Six hours later he had a reaction with high temperature and hot, dry skin; the pulse remained feeble. He was seen at 6 p.m. in this state of reaction, but when seen again at 9 p.m. his friends had carried him into the open air on a cool night in spite of the native attendants, and the skin was again cold and the pulse very weak; further stimulation caused no improvement and he died during the night. There were no other symptoms, the chest and abdomen were normal, and there were no nervous manifestations. There were no late effects in any of the other patients.

Symptoms following the Intravenous Injection of Antimony.

Antimony has a powerful depressant action, and, as the preparation employed is very active, it is only to be expected that a course of treatment should cause the appearance of some symptoms. It has been found that some patients have a high degree of susceptibility to antimony, and they have suffered somewhat severely; also, at the beginning of this work, when attempts were being made to obtain some information as to the dosage, larger doses were given, and the effects were in some cases more marked. With further experience symptoms of any degree of severity have become very rare.

The following are the symptoms which may be seen in patients who are not unusually susceptible.

(1) Fever: The reaction thermique.

(2) Pulse: This is not much accelerated, but so far as can be ascertained by digital examination there is a fall in blood pressure.

(3) Diuresis: There is variable diuresis.

(4) Cough: This occurs in the majority of cases. It begins

a few minutes after administration and lasts for five or ten minutes. Very rarely it has persisted for twelve or twenty-four hours, but only in cases which have slight bronchitis.

(5) Pain in the xiphisternal region. This is a common occurrence and is most severe on the day following an injection. It is probably of gastric origin, as it is relieved by a saline purge.

(6) Headache is not uncommon, but is not severe.

The following symptoms have occurred in cases of great susceptibility to the drug:—

(7) Sickness and Vomiting. This has occurred six times; once it occurred in a fatal case (No. 32A).

(8) Fainting: Only one case. This patient (No. 19), a very hysterical woman, had a dose of 1 gr. and walked half a mile instead of resting in the shed where patients wait after antimony treatment. On arriving at her hut she was sick and vomited and became unconscious; she recovered slightly, but lay groaning for half an hour; the pulse was rapid and weak. At the end of this period she sat up, vomited again and fell asleep; she awoke two hours later a little weak, but otherwise well. Four days later she had stomatitis.

(9) Meteorism: This was seen in one case (No. 2) which was fatal. Captain Thompson saw a similar case eighteen months ago.

(10) Herpes: There have been seven cases. In six the lesions were on the face and lips, and in the seventh along the ribs. This condition is probably similar to the herpes that occurs in certain forms of arsenical poisoning.

(11) Stomatitis: Two cases; one was vesicular, but the other was more severe and ulcerated. In both cases the lesions were limited to the anterior portion of the hard palate and the condition may have been herpetic.

One other symptom—depression—is seen in many cases after a course of antimony. In the ordinary cases it is not more than a feeling of being "out of sorts" and tired, but in very susceptible cases it may amount to severe debility. In any case it passes off rapidly with cessation of treatment, and is succeeded by improvement in the patient's general health and nutrition.

[It is of interest to note that a very similar train of symptoms was observed in dogs experimentally infected with various strains of trypanosomes and treated with antimony. They vomited, passed large quantities of urine, showed great debility and lost weight progressively throughout a course of treatment. As soon as the antimony injections were stopped they recovered rapidly, the

appetite improved, and they regained, or surpassed, their weight before inoculation.]

Some other features of the action of antimony will be discussed.

(1) *Temperature.*—A reaction thermique has been described [4] occurring about twenty minutes after injection of salts of antimony. This subject may be of greater interest owing to the large amount of work that has been done on the subject of "salvarsan fever."

Temperatures have been taken in over 100 cases: (1) At short intervals on the day of an injection, and (2) morning and evening temperatures for three days after treatment.

There is no effect on the temperature till two or three hours after treatment, when it has risen 1° F., and four hours after treatment the average rise is 1·4° F. The same evening, ten to twelve hours after treatment, some cases have fallen to normal, while others have gone up over 101° F. For the next two days there is an average evening temperature of 100·2° F. and 99·7° F., and then the temperature returns to normal. The results are identical in treated and untreated cases; trypanolysis and the disposal of dead trypanosomes do not therefore cause this rise of temperature.

The initial rise may be due to antimony, but the temperature for the two following days is probably due to the saline solution. With the apparatus available here (a small portable still) it is impossible to get thoroughly pure distilled water, and redistillation is out of the question; it would be of interest if some injections could be given with water twice distilled in a good apparatus.

The temperature does not seem to have any effect on the general condition of the patients.

(2) *Leucocytes.*—The action of leucocytes in regard to antimony has been described [6]. Blood films, taken from animals after treatment, were stained and leucocytes found to be crammed with the minute particles of antimony, for which they show great avidity and absorb so much that at varying periods after an injection they disintegrate and shed the drug, presumably in soluble form, into the blood stream, the action being thus spread over a longer period.

A series of 200 leucocyte counts has been made to determine the effect of treatment on the numbers of leucocytes. The cases selected were all under treatment, but some enumerations were made afterwards on untreated cases and the same changes observed.

Immediately after injection of antimony there is a considerable reduction of the leucocytes in the peripheral blood, and in half an hour they have fallen to 60 per cent of the number obtained on

enumeration just before administration. In some cases the count is still lower an hour after the injection. From this point the leucocytes begin to rise in number and in the majority of cases have returned in four to six hours to the level of the first count. This increase continues and twenty-four hours after treatment there is an average count of over 16,000 per cubic millimetre. This is maintained for another twenty-four hours, but four days after treatment the numbers have fallen to approximately the original count. The estimations were continued over a series of three doses and showed the same changes after each.

(3) *Trypanosomes.*—The exceedingly rapid action of the salts of antimony in man has been reported [4], but it was not anticipated that the metal would have an almost immediate trypanocidal action. Trypanosomes were never found in cases examined a few hours after treatment, so observations were made to determine the time required for an intravenous injection of antimony to clear the peripheral circulation of trypanosomes. Only heavily infected cases were selected—a case being considered suitable if ten trypanosomes were found in five minutes in the gland juice, but in many instances they were much more numerous, two and three trypanosomes being often seen in one field. The time was taken from the moment the antimony suspended in saline solution entered a vein in the arm, and at periods from three to thirty minutes after this time glands were punctured and wet preparations made. These were examined by dark-ground and ordinary illumination. In all cases fifteen minutes were allowed for each film and in many cases the search was prolonged up to thirty or forty-five minutes. Gland puncture preparations were examined, as trypanosomes are much more numerous in the glands than in the blood, and owing to the relatively small number in the blood a negative examination is not of much value. It is evident, however, that if all trypanosomes have been cleared out of the glands by intravenous injection, they will also have been killed in the blood stream.

After three minutes (this slide is made before the injection is completed) trypanosomes are still abundant, but some are already obviously affected by the treatment. They show greatly exaggerated activity and dash rapidly across the field, so that they are difficult to keep in view. Frequently a trypanosome becomes anchored by the blunt end, and lashes about most vigorously. This exaggerated motility soon passes into a state of fatigue, when the trypanosome "wriggles" more slowly and more and more feebly till movement ceases. Some retain their normal form, while others become swollen and bloated. Occasionally a trypanosome

comes rapidly to a standstill and dissolves away, so that only a haze of protoplasm can be seen left behind.

After five minutes: The exaggerated motility is not so frequently observed, but the trypanosomes are more often anchored and may be seen lashing about in an extreme state of activity. They appear to be somewhat reduced in number.

After seven minutes: Trypanosomes are more scanty. Exaggerated motility is not a feature of these preparations, but all the other changes occur as in the earlier preparations.

After ten and fifteen minutes: In all preparations taken at these times a considerable search was required to find a trypanosome, but in the majority of cases one could be found in a search of ten or twenty minutes.

After twenty minutes: Very many preparations have been examined and have invariably proved negative.

An intravenous injection of antimony, therefore, kills the trypanosomes in the peripheral circulation in twenty minutes.

LIST OF REFERENCES.

[1] Plimmer and Thomson. *Proc. Roy. Soc.*, 1907, B, vol. lxxx, p. 1.
[2] Kerandel. *Bulletin de la Société de Pathologie exotique*, 1910, Novembre, p. 642.
[3] Manson. *Annals of Tropical Medicine and Parasitology*, 1908, vol. ii, No. 1.
[4] Broden and Rodhain. *Archiv fur Schiffs und Tropenhygiene*, 1908, xii, Heft 14.
[5] Plimmer and Bateman. *Proc. Roy. Soc.*, 1908, B, lxxx, p. 477.
Plimmer and Fry. *Proc. Roy. Soc.*, 1909, B, lxxxi, p. 354.
[6] Plimmer, Fry and Ranken. *Proc. Roy. Soc.*, 1910, B, lxxxiii, p. 140.
[7] Camac. *Brit. Med. Journ.* July 15, 1911, p. 104.

On the Treatment of Yaws by the same Method.

Some cases of yaws have been met with in the course of this work.

In view of the successful results published by Strong, Castellani and Alston, the first three cases were treated with salvarsan. One was given an intramuscular injection of 0·6 grm. in olive oil; the lesions—plantar ulcers—were healed in three weeks. The two others had an intravenous injection of 0·45 grm.; they showed several small patches on the face and trunk and responded much more rapidly to intravenous treatment.

I had been much impressed with the rapid trypanocidal action of metallic antimony, and decided to treat a case of yaws with this drug. At first doses of 1 gr. were given and the condition improved, but not very rapidly. With a larger dose the effect was much more striking. One and a half grains seems to be quite efficient, but 2 gr. have been given to the last four cases. None of the ten

cases has manifested the hypersusceptibility to antimony that has been seen in sleeping-sickness, and there have been no after-effects.

In an adult of fair condition $1\frac{1}{2}$ gr. should be given as a first dose and repeated twice with intervals of four days. I have sometimes shortened the interval by one day, and doses of 2 gr. may be given if the patient takes the drug well. Three doses, I believe, is a quite sufficient course of treatment, but in the majority of our cases a fourth dose has been given to ensure, as far as possible, a permanent result, as most of these cases have been collected from different villages and pass out of observation when they are discharged from hospital. The antimony is administered as described above (page 263) for trypanosomiasis.[1]

The following short notes give an abstract of the cases :—

(1) Lesions small, but generally distributed. There were also septic or impetiginous patches in the beard. Four doses of antimony were given—two of 1 gr. and two of $1\frac{1}{2}$ gr. The lesions were all healed in twelve days, but antiseptic treatment was required for a fortnight longer for the impetigo.

(2) Lesions general and larger than in preceding case. Treatment: Four doses of $1\frac{1}{2}$ gr. All lesions were healed in eleven days.

(3) Extensive ulceration of scrotum. The ulcers had moist surfaces and an exceedingly offensive discharge. Treatment: Four doses of $1\frac{1}{2}$ gr. All healed in eleven days.

(4) A large crusted patch on perineum and several small lesions on face. Treatment : Four doses of $1\frac{1}{2}$ gr. Healed in ten days.

(5) Extensive ulceration on soles of feet. Treatment: Four doses of $1\frac{1}{2}$ gr. Local treatment: Perchloride of mercury 1 to 1,000 as a lotion. Quite healed in fourteen days.

(6) Discharging ulcers between toes. Treatment: Four doses of $1\frac{1}{2}$ gr. Healed in fourteen days.

(7) Generalized eruption. There were large confluent patches all over the face, with similar patches on the trunk, perineum and limbs. There was also a large primary ulcer on the scrotum with very foul discharge. The patient had a very large hydrocele. He was debilitated, and three doses of 1 gr. were given. There was some improvement, but it was very slow, so a dose of 2 gr. was given, and all the lesions healed completely in six days, except the large scrotal ulcer. This was reduced to less than 1 in. in

[1] In the original paper (*Proc. Roy. Soc.*) it was suggested that the initial dose should be 1 gr. This was due to an oversight, and the course of treatment recommended is as suggested above.

diameter, whereas it was over 3 in. before treatment. On account of the hydrocele it was unable to heal. When the surrounding skin became healthy, the hydrocele was tapped and with relief of tension the ulcer at once showed rapid improvement. This patient was under treatment for thirty days.

(8) Some patches on the face with thick raised limpet crusts. Also many small lesions on the scrotum, perineum and buttocks, with moist discharging surfaces. Treatment: One dose of $1\frac{1}{2}$ gr. followed by two doses of 2 gr. and a fourth of $1\frac{1}{2}$ gr. All the lesions healed in ten days, but patient was not discharged till the fourth dose was given.

(9) Small patches on scrotum, penis and perineum. Treatment: One dose of $1\frac{1}{2}$ gr., and two of 2 gr. All healed in ten days.

(10) Small patches on scrotum, penis, perineum and axillæ. Treatment: One dose of $1\frac{1}{2}$ gr. and two of 2 gr. All lesions healed in eleven days.

In all cases the lesions were characteristic of the various stages of yaws, from minute vesico-pustules up to confluent crusted lesions, rupoid patches with limpet-shell crusts, or late plantar ulcers.

The diagnosis was confirmed in the earlier cases by examination of scrapings from the deeper parts of the lesions. Films were examined by dark-ground illumination and spirochætes were found, sometimes in large numbers. In one case with lesions on the scrotum and penis the inguinal glands were enlarged, but spirochætes were not found by gland puncture.

After the first dose the discharging ulcers showed signs of drying up and they skinned over rapidly. In forty-eight hours a distinct improvement was seen; the crusted lesions had shrunk somewhat and no longer contained fluid. The yellow colour disappeared and was replaced by a pearly grey; the underlying raw surface healed very quickly and soon there was only a desquamating flake representing the site of the lesion. Accompanying the local changes there was improvement in the patient's general condition.

The number of cases treated is small, but they have been uniformly successful. The treatment can easily be carried out on a large scale, and it may be possible to cure large numbers of persons affected with this most unsightly, and hitherto long-enduring disease without causing too great a drain on the funds allotted to medical work in these colonies, &c., where this condition is prevalent.

This preparation of antimony was tried in a few cases of

syphilis[1] by intramuscular injection, but the pain was so severe that the method was not continued. I venture to suggest that, as intravenous injection of the metal has proved feasible, a further trial may be warranted in this other spirochætal disease so closely allied to yaws.

For much assistance in carrying out this work I wish to express my great indebtedness to Captain R. J. C. Thompson, R.A.M.C., and to El Yuzbashieh Yussef Effendi Derwish and Cæsar Effendi Khouri of the Medical Corps, Egyptian Army.

Summary of Cases Treated with Antimony only.

Case 1.—Adult, female. January 22, 1912: Many enlarged soft glands; tongue tremor; apathetic facies; heavy infection of trypanosomes in glands. In poor condition.

Treatment.—Complete course of antimony[2]: Course of five doses, followed by three doses. Last dose, March 26.

Present Condition.—Better nourished, alert, cheerful and contented. Glands much smaller. Puncture negative. Blood examination, 9 drops, negative.

Case 2.—Boy, aged 10. November 1, 1911: Obviously an advanced case. Glands very much enlarged; chains on either side of the neck and projecting masses in submaxillary region; axillary and epitrochlear glands enlarged; very thin; marked general tremor; cough; slight difficulty and stiffness in walking; heavy infection of trypanosomes.

Treatment. — November 1 and 4: Antimony, 1½ gr.; slight cough. November 7: Antimony, 2 gr.; severe cough lasting most of the day. November 10: Patient did not seem so well; drowsy; difficulty in walking has increased. November 11: Antimony, 1½ gr.; slight cough. November 12: No apparent ill effects; still drowsy. November 13: Seized at 9 a.m., with severe abdominal pain with acute distension, not relieved by purge or hot stupes; distension rapidly increased up to meteorism; pulse weak, rapid and thready. Death at 4 p.m.

Case 3.—Adult, male. November 1, 1911: Only a few slightly enlarged glands; tongue tremor; general condition good; trypanosomes scanty.

Treatment.—November 1: Antimony, 1 gr.; November 4: 2 gr.; November 7: 3 gr., no symptoms after these doses; November 11: Antimony, 2½ gr., followed by slight sickness; January 9, 13 and 17, 1912: Antimony, 1 gr., last dose January 17. Repeated examinations of blood and

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[1] *Proc. Roy. Soc.*, 1909, October 9, B, lxxxi, p. 354.

[2] For convenience the usual course of treatment (i.e., five doses followed by a shorter course of three doses) has been called a "complete course"; it has been explained that this course will be extended in future.

gland juice negative; general condition good; tongue tremor very slight. May 31: Patient deserted, he belonged to a district 100 miles away, and was the only case from that district.

CASE 4.—Adult, male. Several slightly enlarged glands, no other symptoms, normally thin, but general condition good; trypanosomes numerous.

Treatment.—November 1, and 4, 1911: Antimony, 2 gr.; slight cough; November 7; Antimony 3 gr.; slight sickness and vomiting, malaise; November 11: Antimony 2½ gr.; severe sickness and vomiting with pains in chest and abdomen; patient was rather weak for some days, but quite recovered a week later; January 4, 9, and 13, 1912: Antimony, 1 gr., 3 doses; no symptoms; repeated examination by gland puncture negative; blood examinations negative, 9 drops.

CASE 5.—Adult, female. A few slightly enlarged soft glands; no other symptoms; general condition good (N.B.—This patient is a very small, slight woman), trypanosomes scanty in gland juice; November 4, 1911; Antimony, 1 gr.; November 7: 2 gr.; November 11: 2½ gr., 3 doses. Patient showed no symptoms after any of these doses.

Last Treatment.—November 11, 1911: Has been examined many times since then—always negative; became pregnant soon after admission to camp and has recently given birth to a child; general condition very good; no tremors; glands unpuncturable.

CASE 6.—Adult, male. Chain of small glands on either side; tremor of hands; no tongue tremor. General condition good. Trypanosomes numerous in gland juice.

Treatment.—Five doses of 1 gr.; but patient was unable to take doses at shorter intervals than a week. He was very susceptible to antimony, was always depressed after treatment, and was sick once. A second course of three doses was given six weeks later.

Relapse: Patient remained in good condition clinically; but trypanosomes reappeared in the blood five and a half months after cessation of treatment. Antimony was tried again, but had to be given up after three doses, as the patient showed general weakness and debility. He was transferred to atoxyl treatment.

CASE 7.—Adult, male. A few soft glands, moderately enlarged. Heavy infection of trypanosomes; tremor of tongue and hands; cough general condition poor—a thin, debilitated old man; advanced case.

Treatment.—Four doses of antimony, 1 gr., without untoward symptoms; but some days later he had severe cough, and then developed broncho-pneumonia, which was prevalent at the time, and died four days later.

CASE 9.—Adult, female. A few large and several small soft glands trypanosomes numerous. In rather poor condition; but no other symptoms.

Treatment.—Five doses at weekly intervals followed by three doses. Last dose, February 23, 1912.

Present Condition.—Very good. Glands, unpuncturable. Blood examination, 9 drops, negative.

Case 13.—Adult, male. A few fairly large glands; trypanosomes scanty. General condition good. No other symptoms.

Treatment.—Complete course (i.e., five doses followed by three). Last dose, March 26, 1912.

Present Condition.—Very good. No tremors. All examinations of blood and glands have been negative.

Case 14.—Adult, female. Many very large glands; chains on either side; trypanosomes abundant. General condition poor: a thin old woman. Tremor of tongue and hands.

Treatment.—Complete course. Last dose, March 16, 1912.

Present Condition.—Much improved; slight tongue tremor; no tremor of hands. General condition much better. Glands, barely puncturable, negative. Blood examination negative.

Case 21.—Adult, male. Large soft glands on both sides. Trypanosomes found at once; well-marked tongue tremor; puffy face; œdema of eyelids. General condition poor. Dull, apathetic expression.

Treatment.—Complete course. Last dose, April 22, 1912.

Present Condition.—Very good. No œdema; slight tongue tremor; glands small and hard; puncture negative. Blood examination negative.

Case 22.—Adult, male. Chain of very large glands; trypanosomes abundant; well-marked tongue tremor. General nutrition good.

Treatment.—Complete course. Last dose, April 18, 1912.

Present Condition.—Very good. No tongue tremor; glands much reduced in size: only two can be punctured, and these have always given negative results. Blood examination negative.

Case 24.—Adult, male. Moderately enlarged soft glands on both sides; trypanosomes numerous. General condition poor. General tremor well marked.

Treatment.—February 6, 1912: Antimony, 1 gr.; February 9, 1½ gr.; February 13, 2 gr. There were no symptoms during the day this third dose was given; but the same evening patient developed epileptiform symptoms and died during the night.

Case 25.—Adult, male. Many large glands; trypanosomes scanty. General condition good. Slight tongue tremor.

Treatment.—Complete course. Last dose, April 22, 1912.

Present Condition.—Very good; no tremor. Glands: Only one is puncturable, and it is very hard. All examinations negative. Blood examination negative.

Case 26.—Girl, aged 10. Many large soft glands; trypanosomes numerous; slight tongue tremor; thin, anæmic; stupid, vacant, expression. General condition, poor.

Treatment.—Three courses of three doses, ½ gr. each dose. Last dose, June 11, 1912.

Present Condition.—Improved; much brighter; tongue tremor still present; glands smaller; puncture always negative. Blood examination negative.

Case 27.—Adult, male. Exceedingly large soft glands; trypanosomes abundant; tongue tremor and tremor of hands were very evident. Severe pains in all joints; unable to walk and had to be helped into Yei by two men; characteristic facies; œdema of face and eyes. A most advanced case, apparently verging on third stage.

Treatment.—Complete course. This caused great improvement. Patient felt very well and became more active. Tremor was still present, but œdema and pains disappeared and he put on weight. He was able to act as a native assistant.

Present Condition.—Relapsed clinically. He remained well for three and a half months, but œdema and difficulty in walking have returned, and he is somewhat "mental." The improvement was maintained for three and a half months. Blood examination and gland puncture, negative. Cerebrospinal fluid, increase of cells, but trypanosomes not found.

Case 28.—Boy, aged 11. Chains of glands on either side; trypanosomes not numerous; tongue tremor; puffy face; thin; fatigued. General condition poor.

Treatment.—Complete course, doses of $\frac{3}{4}$ gr. Last dose May 23, 1912.

Present Condition.—Great improvement; has put on weight; energetic, active; œdema gone; tongue tremor present; glands small and hard. Puncture negative. Blood examination negative.

Case 29.—Adult, male. Many large and rather hard glands; trypanosomes scanty; slight tongue tremor. General condition good.

Treatment.—Three courses of three doses. Last dose May 22, 1912. Patient had bronchitis after first course.

Present Condition.—Only one puncturable gland, puncture negative. Blood examination negative. General nutrition good; tongue tremor still present.

Case 30.—Adult, male. A few large soft glands; trypanosomes present in glands. General condition fair; no other symptoms.

Treatment.—Three courses of three doses each. Last dose May 22, 1912.

Present Condition.—Very good; no tremors; only one puncturable gland, puncture negative. Blood examination negative.

Case 31.—Adult, male. Very numerous large soft glands on both sides; trypanosomes abundant; slight tongue tremor. General condition good. Complete course of treatment: but doses at interval of a week as patient had abdominal pain and general debility, following doses of antimony. Relapsed two months after end of course of treatment; trypanosomes reappeared in blood. General condition remains good, transferred to atoxyl.

Case 33.—Adult, male. Chain of small soft glands on right side, and large soft discrete glands on left side; trypanosomes present in fair

numbers; tongue tremor; œdema of eyelids; stupid, dull expression. General condition poor, thin, and ill-nourished.

Treatment.—Complete course. Last dose, June 3, 1912.

Present Condition.—Great improvement, better nourished; no tremor; no œdema. Only one large gland present, and puncture is negative. Blood examination negative.

Case 34.—Adult, female. Only slightly enlarged glands. Trypanosomes not numerous. General condition good. No other symptoms.

Treatment.—Complete course. Last dose, June 3, 1912.

Present Condition.—Very good. No tremors. Glands still puncturable and soft. Puncture negative. Blood examination negative.

Case 35.—Young adult, female. Several soft glands. Trypanosomes numerous. General condition good. No other symptoms.

Treatment.—Complete course. Last dose, June 29, 1912.

Present Condition.—Very good. No tremors. Blood examination negative.

Case 36.—Adult, male. Slightly enlarged glands. Trypanosomes scanty. General condition fair. No other symptoms.

Treatment.—Complete course. Last dose, July 8, 1912.

Present Condition.—Improved. No tremors. Glands smaller. Puncture negative. Blood examination negative.

Case 37.—Young adult, male. Large soft glands. Trypanosomes abundant. Very heavy infection. No other symptoms. General condition fairly good.

Treatment.—Complete course. Last dose, July 8, 1912. Relapsed two months later. Trypanosomes reappeared in blood. General condition poor. Seems "mental"; transferred to atoxyl.

Case 38.—Oldish man. Many enlarged glands. Trypanosomes numerous. General condition only fair; ill-nourished. No other symptoms.

Treatment.—Complete course. Last dose, June 29, 1912. Condition improved, but patient deserted six weeks after course was completed.

Case 40.—Adult, female. A few slightly enlarged soft glands. Trypanosomes not numerous. No other symptoms. General condition good.

Treatment.—Complete course.

Present Condition.—Very good. Glands small. Puncture negative. Blood examination negative.

Case 41.—Adult, female. Moderate enlargement of glands. Trypanosomes not numerous. General condition only fair; poorly nourished. No tremors.

Treatment.—Complete course. Last dose, June 29, 1912.

Present Condition.—Improved. Glands smaller. Puncture negative. Blood examination negative.

Case 42.—Adult, female. Moderately enlarged glands. Trypanosomes

numerous; no tremors. Ill-nourished old woman; very thin. General condition poor.

Treatment.—Complete course. Last dose, June 29, 1912.

Present Condition.—Relapse. Trypanosomes reappeared in blood two and a half months after end of course of treatment. No improvement. Transferred to atoxyl.

CASE 45.—Adult, male. Large, but hard glands. Trypanosomes scanty. General condition good. No other symptoms.

Treatment.—Complete course. Last dose, July 8, 1912.

Present Condition.—Good. Glands smaller. Puncture negative. Blood examination negative.

CASE 46.—Adult, male. Slightly enlarged soft glands. Trypanosomes found at once. Tongue tremor. General condition fair; thin old man.

Treatment.—Complete course. Last dose, July 16, 1912.

Present Condition.—Improved. Tremor still present. General condition better; not so thin. Glands smaller. Puncture negative. Blood examination negative.

CASE 47.—Adult, male. Slightly enlarged glands. Trypanosomes scanty. Tongue tremor. Mental symptoms. General condition poor. Old man, emaciated.

Treatment.—Short course, three doses. A week later had an epileptiform attack—fatal. This was an advanced case, and the epileptiform attack is not considered to be due to the treatment—a full week having elapsed, during which the patient had not manifested any untoward symptoms.

CASE 48.—Adult, male. Glands moderately enlarged. Trypanosomes numerous. No tremor, but œdema of eyes severe. General state fair.

Treatment.—Complete course. Last dose, July 22, 1912.

Present Condition.—Slight improvement. Glands smaller. Puncture negative. Blood examination negative.

CASE 50.—Adult, male. Several large glands on both sides. Trypanosomes numerous. No tremor, no œdema. General condition good.

Treatment.—Complete course of antimony. Last dose, July 26, 1912.

Present Condition.—Improved. General condition very good. Glands small. Puncture negative. Blood examination negative.

CASE 51.—Adult, male. Slightly enlarged glands. Trypanosomes numerous. Tongue tremor. General condition fair.

Treatment.—Complete course. Last dose, July 29, 1912.

Note.—On the suggestion of Dr. Andrew Balfour, toluidin-blue, 1 gr., was given by the mouth half an hour before the first, third and fifth doses of antimony in the first course. It was, therefore, circulating in the blood at the time of injection of antimony. Dr. Balfour considers that it may act as a vehicle for antimony, and enable it to penetrate resistant forms which it is unable to attack when injected alone.

Present Condition.—Much improved. Better nourished. No tremor Glands small. Puncture negative. Blood examination negative.

EXPERIMENTS ON IMMUNIZATION AGAINST *BACILLUS PARATYPHOSUS* A.

By Major S. L. CUMMINS and Major C. C. CUMMING.
Royal Army Medical Corps.

Since the publication of our preliminary note on immunization against *Bacillus paratyphosus* A, in the Journal of the Royal Army Medical Corps for October, 1912, we have desired to carry out investigations on similar lines on groups of human beings, as we realised that experiments on animals, though useful in affording a basis for dosage and in giving a general idea of the results following inoculation, could never justify conclusions as to the desirability or otherwise of issuing a paratyphoid vaccine for the use of soldiers proceeding to India. The opportunity was recently given us of doing some further work on the subject when six privates of the Royal Army Medical Corps offered themselves as volunteers and enabled us to inoculate two groups of three men each, the one with a vaccine of *B. paratyphosus* A alone and the other with a mixed emulsion of that organism and *B. typhosus*. We were able to assure the men that no harm would follow the inoculation as one of us had previously administered doses of 500 and 1,000 millions of *B. paratyphosus* A to a chronic carrier of that germ with no untoward results, and we had also the advantage of access to the work of Major R. W. Clements and Captain W. R. Galwey, R.A.M.C. ("Notes on a Case of a Paratyphoid 'A' Carrier Treated with a Specific Vaccine," Journal of the Royal Army Medical Corps February, 1913), who gave a series of doses rising from 20 to 800 millions to their patient without causing any inconvenience. Still, we wish to express our warm thanks to the volunteers who came forward with the knowledge that the larger doses necessitated by the administration of a mixed emulsion might well cause them several days of pyrexia and malaise. For the purpose of this experiment, a vaccine was prepared from an Indian strain of *B. paratyphosus* A (James), all the steps followed in the case of the routine preparation of the antityphoid vaccine being repeated to make the two vaccines comparable in every way. After killing at 53° C. and preservation through the addition of 0·4 per cent. of lysol, the preparation was allowed to stand for some days before use, and was employed in combination with an antityphoid vaccine of the same date. None of the men forming the "groups" had ever had

typhoid fever, with one exception none of them had ever been out of England, and all were in good health. The one man who had been abroad had been in Malta as a child when his father was stationed there, and he had then suffered from Mediterranean fever. Each man of "Group I" received a first dose of 500 million followed by a second dose of 1,000 million twelve days later, only *B. paratyphosus* A being given. Each man of "Group II" received 500 million each of *B. paratyphosus* A and *B. typhosus* as a first dose and 1,000 million of each germ as a second dose on the twelfth day after the first. With regard to reaction, the only man who suffered from any general reaction after the first dose was a member of Group II, and, indeed, was the man who had been in Malta in his childhood. He had a very sore arm for some days after the inoculation and had to retire to bed with nausea and malaise within an hour of the dose. His temperature rose to 101·8° F. on the evening of the inoculation. He was much better next morning, though still feeling poorly, and was not quite himself until the third morning after the dose. The other two men in this group had congested areas at the site of inoculation for about twenty-four hours, such as usually follow injections of antityphoid vaccine, but beyond this had no symptoms. The three men forming Group I were quite free from reaction beyond a slight redness at the site of injection. The paratyphoid A vaccine alone appeared to give rise to a degree of reaction decidedly less than that usually following antityphoid vaccine. After the second dose all the men in Group II had a fairly smart reaction, though not such as to be regarded as exceptional after a dose of antityphoid vaccine alone. The man who had suffered from a severe reaction on the first occasion escaped with a decidedly less troublesome result on the administration of the second dose. All the members of Group I again got off very lightly, none of them having anything more serious than a patch of redness at the point of inoculation.

Technique of Opsonin Estimation.—The serum of all the men under examination was collected just before the first dose, and twice weekly during the period of the experiment. The serum from each group was pooled and the possibility of small personal idiosyncrasies becoming manifest thus diminished. The blood was allowed to stand for twenty hours in all cases before the serum was drawn off from the clot. The pooled serum of each group was then heated to 58° C. for twenty-five minutes to remove complement and to allow only the specific opsonins to remain demonstrable. For the opsonic tests the bacterial emulsions were invariably made

from twenty-hour growths on agar at 37° C. subcultured from an agar slope kept at room temperature, the same slope being used throughout the experiment to avoid loss of virulence in subculture. For the opsonic estimations, the emulsion was counted by means of the hæmocytometer and standardized to contain 1,000 million bacilli per 1 c.c. before each observation, so as to make successive "counts" as far as possible comparable with each other. The phagocytes used were derived from the same individual throughout. The opsonic mixtures were kept in contact for ten minutes only at 37° C. in order to avoid intracellular digestion of the bacilli. It will be noted that the bacillary emulsion used was much stronger than s usual in opsonic estimations by the method of Wright. In employing the dilution method of Klien[1] a rather thick emulsion is necessary. Klien, however, worked with unheated serum, the object of dilution being to eliminate the influence of bacteriolysis on the "counts," whereas we used heated serum, successive dilutions being employed in order to obtain a more complete picture of the development of specific opsonins than is afforded by the examination of the serum in one concentration only. The highly important work of J. C. G. Ledingham and H. R. Dean[2] on the action of the complement-fractions on a *Tropin-B. typhosus* system, has opened up the whole question of the action of complement on phagocytosis and has shown that the relative concentration of "mid-piece" and "end-piece" in any given serum may lead either to inhibition or increase of the phagocytic action of the specific opsonin present. In view of these facts we decided to adhere to the method employed in our preliminary experiments on rabbits and to use heated serum only. This must be borne in mind when comparing our results with those of other observers, as the use of heated serum, not the production of a less complete immunity, explains the fact that in our experiments the end-point reached is lower, in the case of *B. typhosus*, than that recorded by Klien or Grattan. The opsonic films were stained by Leishman's stain and fifty phagocytes were counted in each dilution.

Technique of Agglutinin Estimation.—The bacterial emulsions used were not standardized by counting, but by the addition of a known volume of saline to a 20-hour growth on an agar slope, this giving a sufficient approximation to constancy for tests not involving the delicate method of counting the bacilli in phagocytes. The serum used was heated, as, even in agglutinin experiments, we

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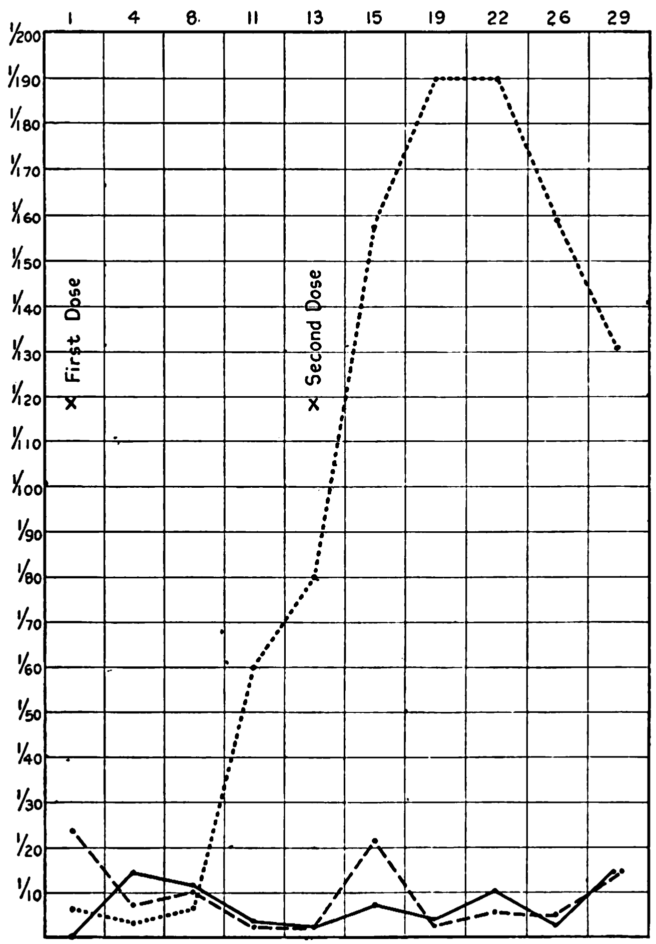
[1] *Johns Hopkins Hospital Bulletin*, vol. xviii, p. 245, 1907.

[2] *Journal of Hygiene*, vol. xii. No. 2, June 19, 1912.

believe that the results of successive estimations are more comparable when complement has been eliminated. The results were read macroscopically, the serum dilution and the bacillary emulsion

CHART I.



Opsonins for *B. paratyphosus* A, Group I; Opsonins for *B. paratyphosus* A, Group II; Opsonins for *B. typhosus*, Group II.

THERMOSTABLE OPSONINS (KLIEN'S METHOD).

being kept in contact, not in the capillary portion of the pipette, but at the junction of the shoulder with the capillary stem. The greater volume of fluid thus made available enables a better idea

of the agglutination process to be obtained than where only the capillary limb of the pipette is filled with fluid. The mixtures were kept at 37° C. for three hours before reading the results.

TABLE I.—THERMOSTABLE OPSONINS.

Dilutions of serum	Day of observation										
	1	4	8	11	13	15	19	22	26	29	Group I, *B. paratyphosus* A
$\frac{1}{384}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{192}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{96}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{48}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{24}$	—	5	7	—	—	—	—	14	—	6	
$\frac{1}{12}$	—	29	24	—	—	8	3	21	—	33	
$\frac{1}{6}$	—	88	58	10	0	69	17	30	11	90	
$\frac{1}{3}$	11	279	171	45	39	95	143	26	39	132	

Dilutions of serum	Day of observation										
	1	4	8	11	13	15	19	22	26	29	Group II, *B. paratyphosus* A
$\frac{1}{384}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{192}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{96}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{48}$	1	—	—	—	—	13	—	—	—	—	
$\frac{1}{24}$	34	—	4	—	—	21	—	—	2	6	
$\frac{1}{12}$	31	8	21	—	—	41	11	14	20	33	
$\frac{1}{6}$	40	66	148	4	8	60	18	29	20	26	
$\frac{1}{3}$	221	228	188	38	25	170	24	8	72	55	

Dilutions of serum	Day of observation										
	1	4	8	11	13	15	19	22	26	29	Group II, *B. typhosus*
$\frac{1}{384}$	—	—	—	—	—	—	—	—	—	—	
$\frac{1}{192}$	—	—	—	—	—	16	39	160	17	10	
$\frac{1}{96}$	—	—	—	6	17	155	127	459	81	27	
$\frac{1}{48}$	—	—	—	472	132	561	834	486	123	56	
$\frac{1}{24}$	—	—	—	327	550	817	563	544	414	104	
$\frac{1}{12}$	3	—	3	594	751	637	622	572	223	184	
$\frac{1}{6}$	54	3	61	678	879	512	760	292	214	147	
$\frac{1}{3}$	32	70	311	600	878	276	668	653	367	223	

The numbers represent the total "counts" in 50 phagocytes in each dilution on each day of observation.

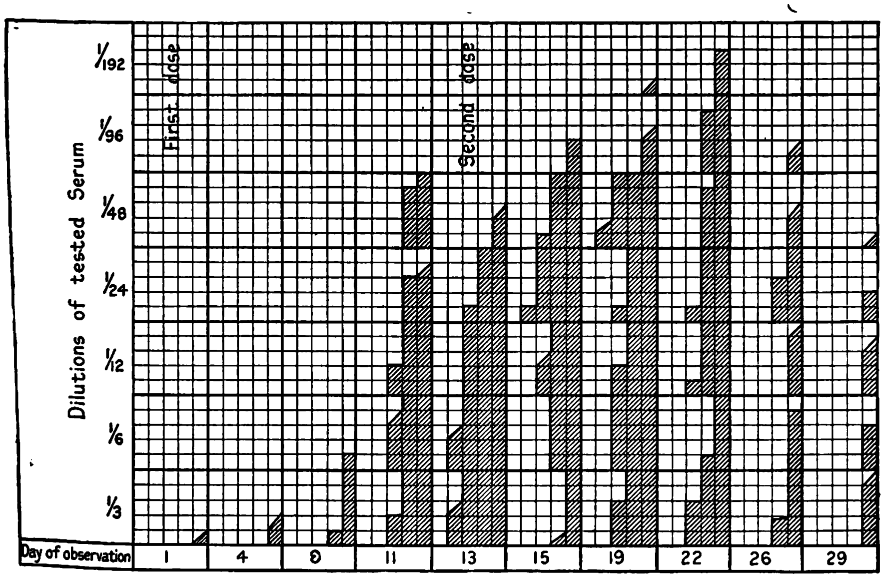
No attempt was made to calculate the bactericidins, as our previous work on this subject had not given satisfactory results. This is to be regretted, as the curious divergence between the development of agglutinins and opsonins in the case of *B. para-*

typhosus A. raises the question whether the bactericidal powers of the serum follow the one or the other. Further experiments will be necessary to decide this point.

Opsonins.—Chart I gives the end-points of the opsonins, calculated by Klien's method, for *B. paratyphosus* A in Group I, and for both organisms in Group II. It will be at once apparent that both

CHART II.

Graphic Representation of the Formation of Thermostable Opsonins for B. typhosus.



The average number of bacilli ingested by each phagocyte, under the influence of each dilution of serum, is represented, for each day of observation, by the number of small squares shaded grey in each large square. Each large square contains twenty-five small ones, a number equivalent to the maximum bacillary content countable in each phagocyte, and each small square therefore corresponds to one bacillus per phagocyte. Half a small square, being equivalent to 0·5 bacilli per phagocyte, represents the opsonic end-point of Klien.

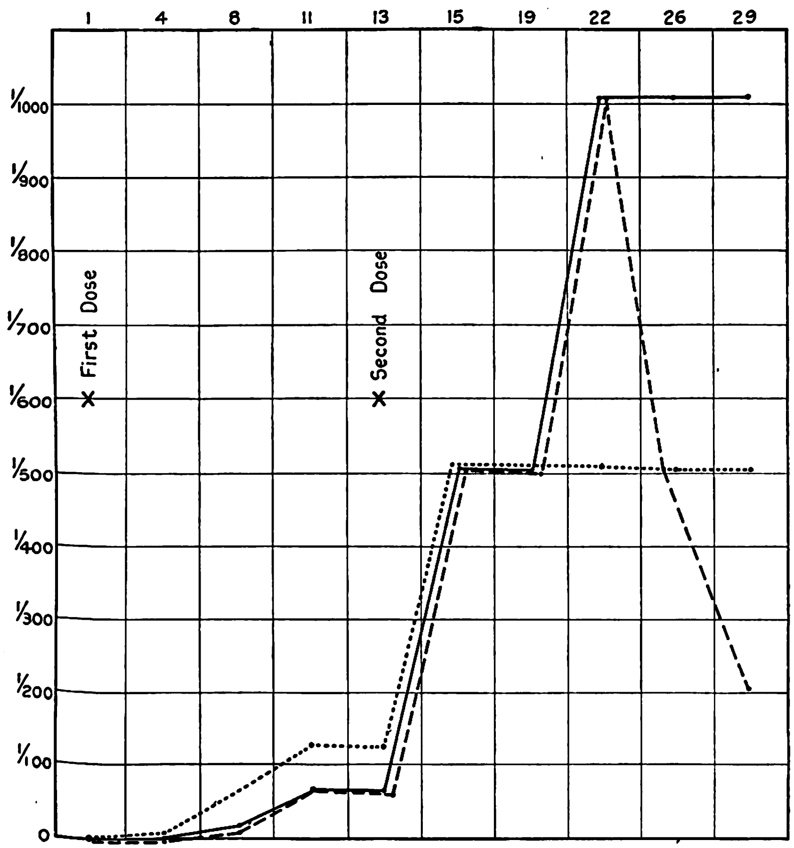
in Group I and Group II the production of opsonins for *B. paratyphosus* A is very small. An examination of the charts will show further that a slight rise took place after each injection, to be followed by a drop when the agglutinins rose to their highest point. A similar phenomenon has already been noticed by us in our experiments with rabbits. The opsonins, in both groups, appeared to rise slightly towards the end of the experiment. The production

of opsonins for *B. typhosus* in Group II affords a marked contrast to that for *B. paratyphosus* A, rising steadily to a maximum and then beginning to fall gradually. The contrast between the two organisms in this matter of opsonin-production is very apparent in Table I, where the actual counts are recorded, up to an end-point and one dilution above it, in a series of columns. In Chart II an attempt has been made to give a graphic representation of the formation of opsonins for *B. typhosus* in Group II, the average number of bacilli per phagocyte being used as a basis. It should be said that, as in previous experiments, we had decided that no count of more than twenty-five bacilli in one phagocyte could be reliable, and we accordingly recorded all uncountable phagocytes as containing twenty-five bacilli. The chart consists of a series of squares, each containing twenty-five smaller squares. Each large square may be taken to represent the average phagocyte in each dilution on each day of observation. Each small square represents one bacillus per phagocyte, and half a small square is equivalent to 0·5 bacilli, the opsonic end-point of Klien, while the whole large square, consisting of twenty-five small ones, represents the maximum opsonic capacity demonstrable for a phagocyte. It is at once apparent on examining the chart that the maximum of concentration of the serum does not go hand in hand with the maximum of phagocytosis. As the end-point rises, the degree of dilution leading to the maximum of phagocytosis also rises, both end-point and degree of phagocytosis appearing to fall together as the wave of immunization recedes. It might be possible to explain this by assuming that there was more rapid intracellular solution of bacilli in the higher concentrations, this being less marked in the dilution that gave the greatest phagocytic index. We are, however, inclined to think that the optimum concentration of serum for phagocytosis varies with the rise in antibody and the concentration of bacteria in the mixture, and that, where the latter is constant, as in our experiments, the optimum conditions for phagocytosis will be found in higher dilutions as the titre in specific opsonin rises. We called attention to a similar phenomenon in our preliminary note on immunization against *B. paratyphosus* A, already quoted.

Returning to the difficulty of producing opsonins for *B. paratyphosus* A, it occurred to us that, in heating the serum, we might conceivably have brought about conditions unfavourable to the demonstration of phagocytosis in the case of this organism. We decided to test this by repeating an observation with the addition

of normal guinea-pig serum in a dilution of 1 in 10 to each phagocytic mixture. The result was to bring about a slight increase of phagocytosis, both as to end-point and number of bacilli per phagocyte in the higher concentrations of serum, but

CHART III.



B. paratyphosus A, Group I; *B. paratyphosus* A, Group II; *B. typhosus*, Group II.

AGGLUTININS.

this was no more in the case of the anti-paratyphosus A serum than in heated normal serum used as a control, and, therefore, must be attributed merely to the normal opsonins present in the guinea-pig serum itself.

The fact that the failure to induce phagocytosis for *B. paratyphosus* A was common to the sera of both Group I and Group II, and that it was consistently demonstrable throughout the investigation leads us to think that the phenomenon is a genuine one, and not dependent upon any inaccuracy of technique, though further work will be necessary to settle this point. We do not attempt to explain it, but merely record the results of our experiments for what they are worth.

Agglutinins.—Turning to the production of agglutinins, the result of our observations is shown in Chart III. This chart brings to light a great difference between the results of inoculation with *B. paratyphosus* A in men and in rabbits. In our previous work, we failed to produce any satisfactory agglutinin titre for this organism in rabbits with doses at all equivalent to those used in the prophylactic inoculation of human beings against *B. typhosus*. In men, however, similar doses led to high production of agglutinins in both Group I and Group II. This success in producing agglutinins contrasts markedly with the failure to evoke opsonin-production in the same groups. The agglutination of *B. typhosus* by the serum of Group II, though giving an end-point lower than for *B. paratyphosus* A, was much more complete and rapid than in the case of the latter organism in all positive dilutions. Still the fact remains that the inoculation of *B. paratyphosus* A led to good formation of agglutinin in men, though failing to do so in rabbits. We anticipated some such result, as Clements and Galwey, already quoted, had recorded high agglutination titres in the serum of their carrier case as the result of inoculation with a vaccine of *B. paratyphosus* A. The salient feature of our research is, then, the curious divergence between the production of opsonin and agglutinin as a result of inoculation with *B. paratyphosus* A vaccine. Whether this observation may have any bearing on the question of the advisability or otherwise of employing this organism for the preparation of a prophylactic vaccine we are as yet unable to say. It appears certain that no harm can result from such inoculations, and we anticipate that the use of a vaccine made from *B. paratyphosus* A alone will be found to give rise to even less reaction than a similar dose of antityphoid vaccine. We are also of opinion that a mixed emulsion containing both organisms can be given with safety, the doses being such as we employed in the above experiments, and it seems that the immunity produced for each organism will be no less than when a single vaccine is given. But the fall in specific opsonins just when the agglutinins reach their

height, in the case of *B. paratyphosus* A, is a point that may require further consideration. Some careful observations on the opsonins formed during an attack of the disease would be of the highest value in elucidating this question, and such observations would yield the most valuable information if carried out by Klien's method. We realize the difficulties that confront the medical officer in India when it is a question of carrying out elaborate and lengthy bacteriological procedures, but possibly some worker in a well-equipped laboratory may find time to investigate this question. We may summarize the result of our work as follows :—

(1) *Bacillus paratyphosus* A vaccine, given in two doses of 500 and 1,000 millions respectively, at an interval of twelve days, gave rise to no reaction of importance.

(2) A mixed emulsion of *B. paratyphosus* A, and *B. typhosus* in similar doses gave rise to a reaction not appreciably more severe than that following antityphoid inoculation. In saying this we make the reservation that individuals may differ in their reaction, and that a final conclusion cannot be reached without a more extended trial.

(3) The serum of persons inoculated with a vaccine of *B. paratyphosus* A was found to develop very little specific opsonin.

(4) Inoculations with *B. paratyphosus* A led, in human beings, to a considerable production of agglutinin in the serum, thus differing from similar inoculations in rabbits.

In conclusion, we desire to express our thanks to the following for their kindness in volunteering to undergo the experimental inoculations: Privates W. B. Symington, J. C. Taylor, B. Querney, W. G. Cocks, A. S. Tilbury and G. Harper, of the Royal Army Medical Corps.

A STUDY IN COMPARATIVE PSYCHOLOGY.

By Colonel R. H. FIRTH.

This article was suggested on seeing a reproduction of Stacy Marks's well-known picture "Instinct and Intellect," in the April, 1913, number of the *Windsor Magazine*. Perhaps somewhat ambitious and certainly not without defects, the article should appeal to those who are disposed to think over present-day problems in full perspective with organic laws and the theory of evolution. Originally planned as an analysis of such mental processes as we may infer fairly from an observance of dumb animals, the article has passed unconsciously into a consideration of the rational faculty as presented by man as well. This shifting of the ground from biology to philosophy may be regrettable to some from the technical and narrower standpoint; still to others, the wider outlook which, conceiving man to be a creature of ideas and with an ideal self which he strives to realize, enables us to see that, in spite of the smaller part which natural selection seems to play among humans, certain inherent factors of organic phenomena still obtain in his evolution, and that man, rational though he be, is still an organism. For convenience, the article is arranged in two sections: The first attempts to analyse mental processes, feelings, and actions in man and animals; the second endeavours to build up on these data a picture or scheme of human mental evolution.

I.

Thinking out the scheme of this article, when sitting on the terrace of my house at Cherat and looking out over the bazaar below and the valley beyond, I see many objects. Among them I see the time gun of the station, a soldier, and many houses and trees. As one looks at these objects one does not localize the sensations which they produce in a particular part of one's retina; but one refers or projects them to particular positions more or less distant. Wonderful and familiar as is this faculty of projection of the object outwards, it is the outcome of the experiences of hundreds of generations of one's forebears. These experiences have not been gained through vision alone, but through this in combination with other senses and actions. It is clear that the consciousness aroused by these objects before me is an accompaniment of certain physiological changes in my brain,

and their outward projection is an act of my mind quite distinct from the passive response in consciousness which one may call an impression, and more complex than the mental act which, through discrimination and recognition, converts the simple impression into a sensation. It is really part of a mental process which is called perception. Sensation does not help me as to the objects before one as such. It is by perception alone that I am aware of their existence, but when I separate out of or build into the object particular qualities or consequences I enter the field of conception. It is obvious that these processes of perception and conception involve certain activities of my mind.

On an adjacent hill I see the time gun; that is, certain cells of my retina are stimulated by light waves of a khaki-yellow quality arranged in a certain shape and, at the bidding of these stimuli, I construct the object which I call a field gun. That object is distant, consists of a hard metal tube mounted on a frame with two wheels and, if loaded and fired, will produce an explosion and noise. Now it is obvious that I cannot see all these qualities of the gun as I call it, I construct mentally the object, on receipt of certain light waves focused on my retina. If I were to go to the gun I can test the correctness of my mental product. But why should I make a mental product with these various qualities or attributes? Experience has taught me that these qualities are grouped together in special ways in a field gun, and I have constructed that particular object through the faculty of association. The stimuli applied to my retina have made merely a suggestion, and what followed has been suggested in memory through association. The object would have been equally well suggested through some other sense, say that of hearing, when it was fired. Now the interesting point is, that the object is a gun, to me, is simply due to a mental process within me; that it really is a gun can only be proved by submitting it to the test of all the senses I possess. The mental product which I have constructed is the object for me but, independently of me, it does not necessarily follow that the gun is really what it appears to me; its reality is what it is to me or any other normally constituted man. This must not be taken to be a negation of the existence of the external world. All it amounts to is a negation that the external world, without the percipient mind, is just the same as it is with it. To take any other view would be to reduce the human mind in the matter of perception to the level of a common mirror. We cannot subscribe to such a view, but hold that

throughout the long ages of evolution the mind has been moulded to the external world. Our perceptions conform to external existences, but they conform, not by copying, but by a process of mental symbolism. To me and to the reader the phenomenal world is the world in which we as conscious beings live and move, but it is more or less a symbolic world or a world which the mind has constructed in the sense that the mind is an essential factor in its being.

As I sit on the terrace, I hear in the bazaar below a yelping noise which suggests a dog in pain. The nature of the howl, through association, raises in my mind the form of a dog; but, why in pain? I cannot see, hear or smell pain in another being, for pain is subjective and known only to the actual sufferer. But, I have experienced pain, and my individual and ancestral experiences lead me to project into the dog I have conjured up certain feelings analogous to those I have myself experienced. Therefore, I construct the mental picture of a dog in pain. The conclusions to be drawn are that, through the action of certain surroundings on my sensitive organization, certain impressions originate sensations which, through association and individual or ancestral experience originate mental products in no sense resembling their causes, but representing them in mental symbolism. In this summary of mental processes, the simple result of a sense stimulus is an impression, and the reception and discrimination of impressions is a sensation. When the sensation suggests the existence of an object world outside oneself, it evolves a perception; but, when we reach the stage when particular qualities are separated out of, or built into the object, we enter the field of conception, and the mental process by which we pass from any perceived event or existences to other associated antecedent, synchronous, or subsequent events or existences, is that of thinking or reasoning.

If these arguments be sound, it will be conceded that the world we see around us is a product of two factors, namely, the things themselves, as they actually exist, and our active minds. In other words, we only know the world as it appears to us, or the world is for us what it appears. That appearance depends upon our mental processes which are perception, giving rise to percepts or perceptual inferences, that is intelligence, and conception or the analysis of phenomena, giving rise to concepts and conceptual inferences, which is reason. Further, in that the sense organs, the senses and sense data in all normal men are the same, we must concede that the perceived world is much the same to an Australian bushman

or savage as it is to a Huxley or to a Bossuet. But, inasmuch as the individual cannot divest himself of the intellectual and conceptual part of his nature, there are differences in the interpretation of the percepts of a savage and of a highly cultured man. Probably, it is no exaggeration to say that for no two human beings is the world we live in quite the same. The elements of all their perceptual worlds are the same, but the interpretation put upon them depends upon the light in which they respectively view them. The man for whom phenomena are more or less conditioned by science finds it difficult to think himself into the position of the man whose perceptual world is conditioned by ignorance and superstition.

When we come to animals, these difficulties are much increased. The sense data are probably much the same, but they have different values. In the object constructed by a dog, by the suggestion of his sense stimuli, the olfactory element must play a part quite beyond our realizations. Then, the ignorance of animals is immense, and that ignorance, coupled with high perceptual faculties and with strong instincts, must produce a creature whose mentality we can never understand. The difficulty is rendered greater because we so often think of them as human, and it is difficult to avoid doing so, since the only world we know is the world as conceptually constructed by man. Newton had a dog called "Diamond"; how different the world must have appeared to the animal and to the master. Each constructed mentally the world as he saw it, and their sensations were, just as ours are, merely mental facts, in no sense resembling their causes, but representing them in mental symbolism. The percepts in us all are really elaborated products of this mental symbolism; and the question is how far does the mental symbolism of the dog resemble ours, and how far does the symbolic world of a dog resemble the symbolic world of man? The answer is largely speculative, and attainable only by help of the theory of organic evolution.

Dealing first with the invertebrates, we may suppose that their mental products are analogous to our own, but we can scarcely think that they in any way resemble ours. Their sense organs are constructed on a plan different from ours and they have, probably, senses of which we are completely ignorant. Conceive how different must be the perceptual world of a fly or a bee, with their mosaic vision, to that of ourselves. In considering such organisms as the insects and invertebrates generally, we must not jump to the conclusion that because they have no backbones they are necessarily low in the scale of intelligence. So acute

an observer as Darwin said that the so-called brain of an ant might be regarded, probably, as the most wonderful piece of matter in the world. The tree of life has many branches and, if the theory of evolution be true, these divergent branches have been growing up side by side; so much so, that there is no reason why the bee and the ant in their branch should not have attained as high a development of structure and intelligence as the elephant or dog in their branch. We do not know that they have, we can only conjecture from the few facts we know concerning them. Let us examine the few facts we know. Howlett's experiments with stomoxys indicate that it lays its eggs, not with any conscious maternal forethought, but simply from a blind and unreasoning response to a certain smell. Following this up with a species of fruit-fly common in India, Howlett found that the female emits a smell resembling citronella, and that males of the species can be caught in traps baited with citronella, since they come to the traps under a blind impulse to follow the scent of the female. If we examine the sexual relations of mosquitoes, we find much to suggest that the male finds the female by its antennæ being turned up to respond to the musical note of her hum. So, again, the biting of mosquitoes seems to be controlled by temperature, in that a female mosquito will bite with avidity at any surface, even of a glass tube, if its temperature be between 35° C. and 45° C. Crude as this knowledge is, it suggests that we regard these insects, not as intelligent beings consciously shaping a path through life, but as beings in a kind of active hypnotic trance, and that in our warfare against them it is no intelligent foe we have to fight, but mere battalions of somnambulists.

Lubbock's classical observations on ants show that those insects have some power of communication. If we go still lower, we can surmise that as visual and olfactory or auditory organs develop and differentiate from a common basis of simple sensation, the process of outward projection has its rudimentary inception. The earthworm, finding its way to food-stuff buried in the soil, seems a case in point. The medusæ and sea anemones have this capacity also in a rudimentary form. In powers of discrimination we are dealing here, possibly, with the lowest stage of mentality, but we cannot say how far such simple responses to stimuli are merely physiological, or how far there enters a psychological element.

Passing to the lower vertebrates, the probabilities are that their perceptual processes are essentially similar to those of animals higher in the scale; but, in proportion as those creatures differ more

and more from ourselves, we may infer that their mental products differ from our own. Watch a fish swimming full of curiosity round a bait; who can doubt that it is, by examination, defining a precept and drawing inferences of a perceptual nature? Watch a thrush on the lawn, listening or eyeing attentively the surface soil; he clearly has a mental picture of the worm he hopes to secure. We have alluded above to the critical examination a fish makes of a tempting bait; no one familiar with the habits of birds can have failed to have noticed how they submit a doubtful object to examination. The myriads of recognition marks, of warning colour and of mimicry which we know of among butterflies, insects and birds, all suggest and involve close and accurate powers of perception on the part of the organisms concerned. The fascinating study of mimicry in nature shows that the suggestion of misleading associations is the very essence of the principle. That some birds can associate arbitrary signs with their percepts will be admitted by all. No better example than the myna or parrot who, by their almost unique powers of articulation, show that not only may the spoken word suggest a mental product, but that the sight of that product may suggest the word that it has heard associated with the object by man. The same conclusion is deducible from most of the tricks taught to and displayed by performing animals, but in interpreting their value, as evidence of psychological processes in those animals, we must remember that the form of words uttered or the movements made by the teacher are essentially for the sake of the man and not for the sake of the animal Even in the quite disinterested and intelligently conducted experiments of von Östen, at Elberfeld, on his horse "Hans," in which that animal achieved a remarkable proficiency in spelling and arithmetic, the conclusion of a commission appointed to investigate the facts was to the effect that von Östen, while believing himself to be teaching "Hans" the rudiments of reading, spelling, arithmetic and spatial relation, had really and simply taught the horse to respond with astounding certainty and precision to certain unconscious and extremely small movements on his own part. It is probable that mere arithmetical performances, in themselves, are no satisfactory test of intelligence in animals, since it is well known that even mentally deficient human beings are capable of performing the most remarkable calculating feats.

We cannot, by the microscopic examination of the brain of a dog or other animal, draw any valid inferences as to the quality of the psychical processes which were associated with their physiological

action; but we can, by observing the activities of animals, draw inferences as to their mental processes. It is worth while considering what information they give concerning the perceptual world or worlds of animals, and the nature of the inferences which we may suppose animals to draw from the phenomena which fall within their observation. Unless the theory of evolution be absolutely wrong, we may assume that whenever we are justified in surmising that psychical processes occur and the power of registration of sense data and revival in memory has been established, the early stages of the process of construction of mental products is the same in kind throughout the whole range of animal life. In the higher mammalia, there is reason to think that their mental products are analogous to our own, though they probably do not resemble ours. Further, with them as with us, a comparatively simple suggestion may give rise, through association and experience, to the construction of a complex mental product. Thus, a dog dozing on a mat hears an unfamiliar step; there can be no doubt that this noise suggests to the dog the mental product, man. That is a case of construction by association. Other animals construct a mental product by examination, as when a dog or cat, if disturbed, smells and looks about until satisfied, by examination, as to the nature of that which has aroused it. The fact that dogs may be deceived by pictures has but a few days ago been illustrated by a case. An excellent and large photograph of a former favourite terrier had just been received by a friend. He placed it on the floor against the chair. His present terrier came in soon after and promptly rushed at it, then walked all round it, and finally in supreme disgust turned away.

The faculty of attention in animals raises some interesting points. In the normal life of animals the attention is perceptually excited. Its importance is obvious as a factor in survival of the species, and it is a factor also in the process or condition of emotion. Imagine a dog dozing: suddenly he raises his head, scents the air, and rushes off to fight an old enemy; after a few minutes he comes back, licks your hand, and calmly lies down again. Analysing this incident we get a sense stimulus, either auditory or olfactory; this gives rise to the percept of a dog, perhaps particularized by a discriminating smell, and followed by a condition of alertness in which the attention is roused. As the outcome of this certain motor activities or tendencies to activity are started and an emotional state is raised in the dog, which culminates in a series of definitely directed actions, in which the emotional tendency seems to work itself out. The

inference is permissible from this and other cases that if no emotional state is aroused in an animal by a percept, then attention is not directed specially to the object, in other words, the concentration of the attention is proportional to the intensity of the emotion evoked; we may say also that animal emotions are certain psychological states which accompany activities or tendencies to activity. But these activities seem to be dependent on the circumstance that the organism be in a fitting condition, and this condition may be variable. We speak constantly of the motor accompaniments of an emotional state as the "expression of the emotions"; in accuracy, this expression is the partial fulfilment of an emotion by action. Though it is quite possible for man to experience an emotion without any motor accompaniment, still we must admit that in emotional states there is an unfulfilled tendency to action, and that such motor accompaniments are the objective aspect of what, under its subjective aspect, is the emotion. In man, the failure of an emotion to pass into motor activity would seem to depend largely on the operation of the faculty of inhibition. In animals, we have no evidence of this faculty of inhibition as a sequel of cerebration, but rather that what inhibition there may be is largely reflex and dependent on physical condition. Anyhow, the elementary facts justify us in the view that the simpler emotions, such as anger and fear, are shared with us by animals. The following observations suggest that they are instinctive. Once my wife and I kept poultry in India. A young chick, only two days old, was feeding from my hand. In the house we had a young hawk whom we were trying to rear and tame. Suddenly the hawk gave a shrill cry, evidently excited by hearing the twittering of the young chicks outside, but equally suddenly the little chick bolted for cover, and remained there in evident fear. Another instance of instinctive fear or antipathy is familiar to most readers. Take a basket of blind kittens and then put your hand after stroking a dog into the basket of kittens. Nine times out of ten the smell of your doggie hand will make the blind kittens spit and puff in a fashion suggestive of fear and anger.

That many animals display affection, not only towards their own offspring but towards man and other animals, is a matter of familiar observation. These attachments are often both strange and capricious. A curious case of sympathy came under my notice a few months ago. In Peshawar we have a small Zoo. Watching the monkeys one day, two baboons started fighting and one retreated to a corner of the cage, with his leg deeply wounded. A

small capuchin, who had been watching the fight, followed the vanquished and wounded baboon and, nestling close to him, tried to comfort him. To me the whole action was highly suggestive of sympathy. That dogs feel sympathy with man is sufficiently well known to need no special examples. These few references are sufficient to credit animals with general and simple forms of emotion, such as anger, fear, antipathy, affection, and some forms of sympathy. Familiar anecdotes and the literature concerning animals and their ways warrant our crediting them also with jealousy, envy, pride, emulation, resentment, deceit, and other more complex emotional states. Inasmuch as every one of these conditions is essentially human, we need to be cautious and mindful of the danger of anthropomorphism. The emotions of civilized man have assumed their present form in the midst of complex social surroundings. In their terms we have to decipher the much simpler emotional states of the lower animals. We are obliged to call them by the same names, and also to think of them as being like to those that we experience. Herein lies the danger of a fallacy. All that we can hope to see in the mirror of the animal mind is a distorted image of our own emotional or mental features. And, since the mirrors are of unknown or varying curvature, we are really in a hopeless position to estimate accurately the amount of distortion. We need to remember this and look narrowly, and to think critically of all anecdotes of animal intelligence and emotion. Our difficulty is to discriminate the observed fact from the observer's inference. Watch a cat play with a mouse. My wife, witnessing such an incident, sees cruelty; but, is it cruelty? Is it not rather practice in a branch of the everyday business of a cat? What seems objectively cruel from the human standpoint is, from the other point of view, not done from a motive of cruelty at all. Again, a friend of mine tells me that once he had a dog who, apparently, disliked following him on long bicycle runs. One day, taking out his bicycle to go for a run, he called to his dog to come too. The dog came limping and hobbling as if lame. Examination revealed no cause for the lameness. My friend tells the story as one illustrating a deliberate design of deceiving on the part of the dog. It is open to doubt whether it was so, but rather a direct association of ideas in that dog between a lame gait and more sympathy or attention than usual. One cannot deny objective deceitfulness to the dog, but it is legitimate to question that there was the motive to deceive. To read in the incident a deceitful intent is the observer's inference, but not the observed fact. We

all know Romanes' story of the elephant to whom a man had given a sandwich of cayenne pepper. Six weeks later, when the man next saw the elephant he went up to stroke it but, watching an opportunity, the elephant filled his trunk with dirty water and drenched the man. Here, the inference seems to be that the elephant harboured feelings of revenge for six weeks. Possibly; but it may be that the animal never once pictured mentally the man during those six weeks, but, on seeing him again, remembered the injury and paid him back. Revenge and vindictiveness to us imply the keeping steadily of an injury before the mind, for the purpose of ultimate avenge. It seems to be going a bit too far to say the elephant did that.

An interesting question connected with the psychology of animals is that of their capacities for pleasure and pain. It seems hopeless to know how little or how much the invertebrates feel or are psychologically sensitive. Among the vertebrates, we can only conjecture their feelings by their cries or gestures and even among the highest members, it is not he who cries the loudest that is necessarily the most hurt. Anyone who has shot rabbits is familiar with the almost human cries which those rodents emit when struck by shot; one has heard the same pitiful wail from their burrows when ferrets have been put in. It is difficult to avoid the conclusion that these are all cries expressive of pain, and not to be wholly explained as the outcome of fright or fear. One never hears these cries in the laboratory, where dozens of rabbits are handled, injected, and yet give vent to no real sign of fear or fright. As suggestive of the opposite view, that animals feel pain hardly at all, the following incident up the Khyber in 1898 has ever impressed me. A small skirmish at long range was going on, in which a convoy was the centre of interest. Close by me, I heard a characteristic plug and, looking round, saw a stream of blood oozing from a gaping wound through the flesh of the shoulder and chest of a camel. The animal was standing with its load and apparently quite unconscious of any injury, as it went on chewing its cud, ultimately moved on as if nothing had happened, and carried its load into camp some five hours later. I know of another case where a tonga pony on the Murree Road broke its leg in a frantic tussle with its harness and the vehicle. Pending the arrival of a man with a rifle to shoot it, the pony hobbled along on three legs to an inviting plot of grass, near by, and calmly grazed as if nothing particular had happened. One's own observations are too few to be emphatic as to the susceptibility of animals to pain or even

pleasure. In this case, perhaps, the confession of actual doubt is better than the delusion of dogmatic certainty. In spite of such cases as quoted above, it is very difficult to deny that animals feel more or less acutely; but how acutely we cannot tell. One is inclined to think that when animals do feel pain, the pain is mainly local and does not involve anything like the shock or general neural disturbance which corresponding lesions entail in man. In any case, whether their pain be acute or dull or their pleasure be intense or slight, our altruistic sense compels us to do our best to increase the pleasure and lessen the pain of the dumb brutes who minister to our wants.

Romanes, that fascinating writer on animal intelligence, alludes to the curious change which has been produced in the domestic dog as compared with wild dogs, with reference to the enduring of pain. This contrast, he considers, is analogous to that which obtains between savage and civilized man, and attributable to refinement of life engendering refinement of nervous organization. It is questionable whether this suffices to explain the difference; but rather that the domestic dog, from his association with man, has learned to give expression to his feelings by barks, yelps, and whines. To howl at every little pain would bring disaster on the wild dog by advertising him to his enemies. It may not be an all-sufficing explanation, but to me it seems that in the one case to howl is advantageous by attracting petting and coddling, in the other it is disadvantageous as imperilling security.

How far animals are able to infuse into their mental products of other animals the element of feeling, or that animals are aware of the pain they inflict on others, is difficult to appraise. No one can watch two dogs mock-fighting without concluding that they possess a consciousness of the pain they might inflict, but avoid inflicting. One has thought a good deal about this question, and the longer one thinks the more certain one becomes that animals do project into each other the shadows of the feelings of which they themselves are conscious. In this connexion, one is tempted to say that the higher animals are able to proceed some way in the formation of complex mental products analogous to but somewhat different from those which we form ourselves. These mental products or constructions, through association with re-constructions, link themselves in series, so that a sensation or group of sensations may suggest a train of new mental products, or a series of remembered phenomena. This brings us perilously near to the question of inferences on the part of animals; in spite of its

difficulties, the question is worth considering briefly. Inferences are of two kinds; perceptual and conceptual. A perceptual inference is one which is the outcome of some practical experience, and not going beyond such practical experience. A conceptual inference is one based also on experience, but reached by and through the reasoning faculties, and predicting or formulating occurrences never before experienced. The one kind deals with matters or affairs practically, the other kind explains them. The former are but a matter of intelligence, while the latter involve the higher faculty of reason. If we define an "inference," we can say it is the passing of the mind from something given immediately to something not given, but suggested through experience and association. Of unconscious (perceptual) inferences in animals we have given some examples, but it is concerning the intelligent inferences of animals we have now to think. If we examine the more remarkable of the cases of animal intelligence, we find that they suggest perceptual inference rather than the employment of reason or the construction of abstract ideas. Arguing this point with a friend, he quoted me the case of an elephant which he had known; that animal was in the habit of handing up soft and breakable articles to his mahout rapidly and gently, but handed up heavy, hard, and less fragile things quickly or forcibly. My friend argued that the facts showed that the elephant recognized such qualities as weight, hardness, and sharpness. As representing dominant elements in the mental products which the elephant formed of each article, we can agree; but one fails to see evidence of any conscious inferences, or any process involving an analysis of the phenomena with subsequent synthesis. He quoted also to me Rae's story of the Arctic foxes who, after seeing some of their number shot by the baited gun-traps, avoided the danger and reached the bait by either gnawing through the string connecting the bait with the gun, or by tunnelling through the snow at right angles to the line of fire, and pulling the bait downwards, were able to discharge the gun away from themselves. The mere fact that they did this only after one or more of their number had been shot, suggests that their subsequent actions resulted really from their ultra-keen perceptions leading them to see that the food exposed was dangerous, and to be approached with caution. Whatever be the explanation of the conduct of those foxes, that conduct suggests certainly a high grade of intelligence, even if we do withhold the credit of a truly reasoned line of action. Not satisfied with this, my friend quoted the story given by Romanes, of a monkey who, after unscrewing a knob on a

fender, managed to screw it on again. Soon after this discussion, I happened to come across a beetle rolling a ball of what looked like dung over an uneven piece of ground. Being interested, I watched the beetle's efforts for some while. It found itself in a small hollow, whose sides were too steep to allow the ball to be pushed up and away. The beetle promptly left the ball and started pushing and scraping down the earth at one side of the hollow and, ultimately produced a less steep slope up which it readily pushed the ball. From these two cases, are we to say that the monkey and beetle discovered the mechanical principles of the screw and inclined plane? In that a mechanical principle is a conception, one has difficulty in believing that it is within the mental range of a monkey or a beetle. What they discovered was, merely, that the action of screwing and flattening down produced certain results; these are very different from discovering the principles of the screw or inclined plane. Closely analogous to these two examples of animal or insect intelligence, are the cases of dogs and horses which have learnt how to raise door latches and so escape from places in which they happen to be confined. I have known of several instances of the kind, but in them all the success which attended the animal's efforts was primarily due to the accidental discovery on their part that, if their nose or paw pressed or touched forcibly certain projections, the door opened and gave them exit. In these cases, undoubted intelligence has been displayed, but one cannot read into the actions of the animals any evidence of true reasoning. A case of similar, if not greater, complexity is that of a battery mule whose action I noticed some years ago when in camp. A row of mules were tethered in line; suddenly, one of them reached round the quarters of the mule to the left and, pulling the tail of the next adjacent mule, quickly resumed its wonted place and demeanour, as if it had played no part in the tail pulling. At the time, I gave that mule credit for a definite sense of humour, and am inclined to do so now. But, can I give it credit for anything more? I think not. The real explanation of the incident lies, probably, in the fact that usually the tail puller and the mule whose tail was pulled stood next to each other. The apparent humorist mule simply did what habit impelled it to do, and the only evidence of a mental process on its part lies in the circumstance that it pulled, not the tail of its immediate neighbour, but that of the one it was accustomed to pull, regardless of propinquity. In this discrimination, possibly, a distinctive smell or association was the determining cause. Much as I would like to, I am unable

to credit the mule with having reasoned out his action as a conceptual inference. The mule was, perhaps, a humorist, but quite unconsciously so.

One might give many more examples of the kind, but their interpretation turns on the sense in which we use the word "reason." As one understands it, reason implies the conscious knowledge of the relation between means employed and ends attained, and, in its application to the case of animals, all depends on what is implied by "knowledge," and whether that knowledge is perceptual or conceptual. All our evidence suggests only perceptual knowledge on the part of animals; analysis so essential to ratiocination is generically different from the process of perceptual construction, and, that being so, one sees no grounds for believing that the conduct of animals, wonderful and intelligent as it is, in any instance is really rational. This brings us to the view that the introduction of the ability to analyse marks a new departure in psychological evolution, which departure came about by language, the first step towards which was the associating of an uttered sound with some dominant quality or activity. This and other symbolized or named dominants then became an abstract idea. This advance in evolution separated mind from body in thought, or the self was differentiated from the non-self, and the consciousness of the beast became the self-consciousness of man. In other words, language and the analytical faculty it made possible, differentiates man from the brute. Paraphrasing Mivart, one can say that the being who can think "this man is" is the being who has the power of thinking "thing" or "something," and has the power of transcending space and time by dividing or decomposing the phenomenally one. This is the point where intelligence ends and reason begins. In drawing a distinction between intelligence and reason, one does not belittle intelligence; neither, in contending that animals have only intelligence but not reason, does one do an injustice to the brute or animal world. Three-fourths of the actions of average men are intelligent but not rational; therefore, one merely places the inferences of the higher animals in the same class as those which characterize the actions of hundreds of practical men who, though in the highest degree intelligent, have the rational or analytical faculty but little developed.

This section would be incomplete without some reference to the habits and instincts of animals. In speaking of the activities of animals and the motives by which they are prompted, we must remember that the two sets of phenomena belong to distinct

categories, the one being physical and the other psychical. In spite of this their connexion with each other amounts practically to identity. They may be described as two aspects of one and the same thing; if viewed from without they are a series of physical and physiological phenomena, but felt from within they are a series of mental and psychological phenomena. In no other way can we describe the connexion between body and mind, or between the physical and the psychical. At best it but states the facts, and clearly affords no explanation. The actions of animals are the outcomes of experiences and associations recorded through generations of forbears. Given an appropriate stimulus, an impulse or desire is roused and a whole train of activities started with accuracy and precision. True, often some amount of individual education is needed to establish the latent powers of both body and mind, yet the ability to manifest those powers is inborn and only requires to be cultivated. This is true of man as well as of animals. Just as much of the work of the world is done by people of whom nobody ever hears, so the work of life is done largely by habits of which nobody ever thinks. The importance of the establishment of these habitual activities is enormous. Watch a cat stalking a bird; her whole attention is fixed on the object of her desire, to the complete indifference of her bodily movements. No one can watch animals without being impressed with the fact that they are very largely creatures of habit; man is the same, but to a lesser degree. From habitual activities we pass by easy steps to those classed as instinctive, and both habits and instinct are based upon innate capacity. Whereas activities, the outcome of habit, require usually some learning or practice and often some intelligence, those the outcome of instinct are performed without instruction or the exercise of intelligence. We can thus conceive the perfect instinct in which an action occurs at once and without practice, also the incomplete instinct in which action occurs from self-suggested trial and practice. A duckling swims at once, though it may never have seen water since it emerged from the egg; but a new-born puppy thrown into water drowns; yet the puppy's brother when fully grown will swim, though he may have never been in water in his life. Young birds do not need to be taught to fly, but do so instinctively so soon as the body is developed sufficiently to render the activity possible.

The ants and bees are credited with remarkable and complete instincts. Many of the stories about them are possibly warped; certainly, one's own observations on ants do not suggest that

the young ants come into the world with a full knowledge of their duties as members of the ant community. When I was stationed at Mian Mir, a bathroom in my bungalow was a happy field for watching ant life. It sheltered five ant colonies and, of these, four were apparently not only of different kinds but mutually hostile. Many a battle have I watched in that bathroom. So far as I could make out, the young ants were employed as nurses in looking after the pupæ. Further, the young ants never joined in the many fights that went on between the rival colonies. This suggests that before an ant can become a warrior he must go through some education and experience. Once or twice I put some young ants taken from all the mutually hostile colonies under a glass with some pupæ to look after. There was no fighting between them, in spite of the fact that their respective elders invariably attacked each other whenever they met. Later, the pupæ hatched out, and the final result was that each kind separated out and the whole lot seemed willing to live amicably under the bell-jar, as so many distinct colonies. These observations all point to the combative spirit in the ants as being something which they have to be educated up to, and that it is not instinctive.

A curious feature of the habits and instincts of animals is the blind prevision which they display. We cannot call it foresight, since their particular actions are performed prior to any individual experiences of the results; they would seem to be done in blind obedience to an internal impulse. Familiar examples are the hen incubating her eggs though she has never seen a chick, and the caterpillar making a cocoon for its imago condition, of which it has never had an experience. We must admit that some instincts may have arisen from the growth and co-ordination of reflex actions; the probability, however, is that the majority have arisen either by the elimination through natural selection of chance unintelligent or intelligent activities, which have happened to be unprofitable, or the selection, through preferential mating, of unintelligent or intelligent activities found to be useful; or the inheritance of individually acquired modifications of both kinds. In all cases, where intelligence has been a co-operating factor, this intelligence has lapsed so soon as the habit became instinctive. An animal may have been forced by circumstances to modify its habits without the exercise of any intelligence; and this modification, forced by changed conditions upon all members of a species, may, by inheritance, have passed into the fixed condition we call instinct. As illustrative of these conclusions we

can conceive that the incubating instinct arose without any intelligence, but simply from the action of the circumstance that the individual which kept its eggs warm had the best chance of rearing progeny. Elimination of the unfit and survival of the fit was the dominant factor which led up to caterpillars spinning cocoons, and the many instincts shown by the social hymenoptera. Selection by preferential mating probably accounts for the drumming of snipe and the æsthetic habits and love antics of the bower bird; while inheritance must account for the instinctive fear of man, so prevalent among animals and birds, and also for such an instinct as ants forming nests in trees in areas liable to flood. Space will not allow of this complex subject being considered further, other than to say that any separation of the instinctive actions from other actions among animals is largely arbitrary. Further, imitation and the emotional state must account for many animal activities which we see around us. As regards volition, including both fulfilment and inhibition of action in animals, we must remember that volition in animals is perceptual; in man it is conceptual. Some animals, like the dog, can choose a line of action, yielding to the stronger motive and be conscious of choosing. But that animal cannot, like man, reflect upon its choice and exercise free will; to do that involves conceptual thought and a consciousness of self. One cannot admit that any animal has consciousness of self; an animal is conscious of itself as suffering or rejoicing, but the consciousness is perceptual, there being no separation of the self as an entity distinct from the pain or pleasure. If one understands the matter rightly, it is in this that lies the difference between the brute and man; moreover, the faculty of choosing is the mark of individuality, and individuality is a symbol of intelligence but not necessarily of reason.

II.

In attempting to formulate a picture of mental evolution in man, we are at once confronted with the question as to from what has mind been evolved, and what is the relation of mind to body. Of mind or soul, we know nothing; we know only mental processes, and mind is only a concept to which we fasten a chain of mental events. The body is only a chain of organic processes for whose permanent and actual foundation we seek vainly, and whose constant connexion in time and space alone justifies us in regarding it as a separate entity. Mind and body are thus for us, whatever

their actual essence, merely secondary concepts whose uniting point is to be sought in the nature of knowledge. In the forefront of any discussion as to the relation of mind to body or matter lies the law of a closed natural causality, namely, that a physical cause can produce only a physical effect. This law holds good for animal and human as much as for the inorganic world. Concerning this law and the associated doctrine of the conservation of energy, so far as it relates to mental processes, one is forced to conclude that it is fundamentally inapplicable to and refuted by every instance of the working of the mind on the body. Since it cannot be denied that bodily conditions affect markedly mental states and vice versa, we must conceive man to be a psychophysical unity.

It would be unprofitable to enter into all the arguments supporting a pure materialism as explanatory of the relation between mind and body or matter, but, even if they be otherwise acceptable, they present the great difficulty that they are inconsistent with the fact that all useful manifestations of energy by man are phenomena of consciousness. Equally unsatisfactory is the theory of neo-vitalism, and so is the dualistic interaction theory, according to which a conversion of physical energy into pscyhical energy is assumed; neither of these can be reconciled with natural laws. On the general question our main interest centres in the law of causality. Here, obviously, a causal relation between a mental, immaterial, and spaceless process on the one hand, and a bodily, material, and spatial process on the other, involves an infraction of that law unless these two processes be one and not two processes. We must accept it as an empiric fact, that during our whole life mental processes and mental capacities, after they have become habitual, become automatic, and, finally, unconscious, bodily, and purely mechanical processes.

What, then, is the distinction between these two systems of mental and bodily processes? The sole fundamental distinction appears to lie in the employment of our concept of space. The bodily process equals or comprehends spatial material, and the mental process equals or comprehends spaceless immateriality; only space-filling content can be regarded as material. We have, therefore, not two real processes, but only one and the same fundamental real process, which we regard objectively as space-filling or bodily, and subjectively as spaceless immaterial or conscious and mental; that is, the apparently two-fold nature of the bodily and mental series is resolved into a two-fold ideal system or mode of

regard, and identity replaces difference. The better comprehension of this view will perhaps follow the following example. A mosquito settles on my hand, I shake my hand and arm to drive it away. I describe that sequence of events by saying that a certain stimulus on my hand evoked a sensation to counteract which my will moved my arm and hand. Expressed in physiological terms, the movement of my arm and hand was due solely to changes in my cerebral motor areas the outcome of external and internal excitations, after a complex series of association and dissociation processes in my cortex. These latter in psychological terms I am bound to describe as thought, feeling, will, &c. Therefore, in saying that my will moved my arm and that stimuli evoked sensations, I clearly and simply change from one system of ideas to the other, which is far from being the same thing as an interaction between the psychical and the physical.

In the individual, as in the race, the transformation of the conscious and mental into the unconscious and bodily is continually going on, resulting in the performance of complicated reflexes, co-ordinated conduct and complete thought processes; and this takes place quite independently of consciousness, according to the manner in which they have been trained or exercised. From this point of view the current terms subconscious and unconscious mental processes are self-contradictory and untenable. This one fact of the conscious sinking into the unconscious removes any antithesis or difference in kind between mental and bodily processes, and their identical nature forces itself irresistibly upon us; so much so that we may say that we have here not merely parallelism but transformation.

The hypothesis, therefore, which commends itself to my mind as best meeting the difficulties of this very difficult subject is that the apparent difference between the mental and bodily series lies entirely in the mode of regard, that is, whether apprehended objectively or subjectively by the apprehending subject. Further, the most that one assumes is that we have two orders of phenomena or two streams of evolution, the objective and the subjective. The two streams of evolution run parallel, or even are one stream looked at from two opposite banks. In other words, we may put it that, parallel to the evolution of organic and physical manifestations, there has been an evolution of psychical manifestations culminating in conscious thought or mind. According to this view, the two distinct orders of phenomena, the physical and the psychical, are distinct only as being different manifestations of the same noumenal

series. The question here arises, how and why has this culmination of psychical energy, which we call mind, come about? Without transcending knowledge the complete answer is impossible; we can but conjecture, and it is to such conjectures we may now proceed.

If the reader has followed the fundamental argument of the first part of this article, he recognizes that, when we pass from man to the lower animals the psychical implications become progressively less forcible and less inevitable as the gestures and actions become more dissimilar from those which obtain in man. The only psychical process we know really or directly is our own human consciousness, and it is in terms of this that we have to interpret all other forms of mentality. In the first part of this article, one has endeavoured to analyse the legitimate inferences concerning the mental processes in animals. That analysis brought us to the conclusion that volition is the hall-mark of individuality, and that individuality is the sign of intelligence, but not necessarily of reason. Further, that all voluntary activities are either perceptual or conceptual in origin, and that the voluntary activities of animals are essentially perceptual, and that only in man is a voluntary act initiated by a concept; the motive being desire as distinguished from appetence, and the result what we call conduct. Animals would seem to be motived only by either the unconscious reaction of nerve centres, by impulse, or by appetence. They appear to be incapable of the higher desire, or of conduct. It is only within voluntary activities initiated by concepts that morality, which is a matter of ideals, takes its origin and all moral progress is truly the outcome of the self-conscious or ideal self desiring to reach a higher standard. This self-consciousness implies the possession of the analytical faculty, and this new departure in the mentality of animate creation was rendered possible through language, which by naming an object or action allowed it to be floated off by its vocal sign. That which was inseparable in fact, became separable, henceforth, in thought. Possibly, there was a transitory stage when the word-signs stood only for objects and not abstract ideas; even so, these vocal symbols were the stepping-stones from the perceptual inferences of animal man to the conceptual inferences of rational man; or, to modify the analogy, they were the means by which early man floated off from the things of sense into the air of abstract thought. We may, now, endeavour to trace how from these simple beginnings the mentality of man has evolved.

In the course of organic evolution, several anthropoid species evolved, and some of them have survived to our time. One of these

species, or possibly more than one, abandoned an arboreal for a terrestrial life, being led to this in all probability by a search for food. Learning to stalk game, this homo-simian acquired rudimentary speech and language till, with the acquisition of that faculty, he learnt to think not only of things which he saw about him, but also concerning himself. In the presence of this pre-human or nearly human anthropoid, the ancestors of extant gorillas, chimpanzees and ourangs found little chance of evolving on similar lines, as the former was the superior being. This superior being, by the adoption of terrestrial life, in the stress of surrounding competition was compelled to use all his wits, to think and rely more and more upon his increasing intelligence, advancing to reason, in hunting prey and consolidating his advantage or superiority over the brutes around him. As the species advanced in mental endowment, the evolving man realized that the conditions against which he was struggling were largely of his own creating. These conditions were mainly a competition with the fellow members of his species, accentuated by a communal life adopted partly for security and, possibly, also from the unconscious action of the social instinct inherited from the ape from which he sprung. Communal life must have been dominant quite early in man's evolution from the anthropoid, and close association, apart from giving security, was necessary to allow one individual to learn from another by imitation. As contributing to a sharpening of the wits, were inter-tribal warfare, the need to secure food, and the operation of sexual rivalry. This latter found expression in polygamy, a practice which prevailed most certainly among primitive men and is even now instinctive to man. As success in securing wives must have depended on excellence of physical and mental endowment, or mean mental personality, sexual rivalry was a by no means negligible factor in man's mental advancement. Any favourable effect from polygamy or sexual rivalry, in this way, involves the inheritance of mental attributes; a fact of which I have little doubt. That what we call genius is so seldom inherited is presumably due to the circumstance that the man of genius is so rarely suitably mated. If, however, a highly-gifted man happens to mate with a large number of women, the chances of a union favourable to the production of highly-gifted offspring are obviously much increased.

By the action of these environmental conditions, man's mental activity has gradually advanced to the plane on which it moves at present. This means that the nature and extent of mental endowment of a people has depended upon the environment in which the

race exists; and it explains why mental evolution has remained stationary among some species of animals and some races of men for thousands of years. True as this is we must be careful to distinguish between the actual and potential mental capacity of a race, be it extant or extinct. Because an Australian aborigine is at a low level of culture now, it is not safe to conclude that he is incapable of a higher; similarly, because Palæolithic man has left evidence of a very crude and rudimentary civilization behind him, we must not assume that he was incapable of anything better. It is all a question of opportunity and the existence of conditions stimulative to the development of potential abilities. This question of unrealized psychic potentiality is probably operative now. Just as our primitive ancestors only partially realized themselves, so modern man rarely realizes himself to the full. It is mainly a matter of conditions, be they social, conjugal or economic.

These considerations indicate one conclusion, and it is that just as the environment of physical phenomena is itself physical so is the environment of psychical phenomena, such as emotion, perception, and thought itself, psychical. Now we may divide the psychic concomitants of mental processes into two classes: first, those which are associated with brain processes leading directly to motor activities; second, those which are of the nature of thought or æsthetic emotion and associated, therefore, only indirectly with neural processes which lead to motor activities. The one group is associated with practical and the other with theoretical results. The question here arises, how far has mental evolution, as inclusive of these two groups of psychical phenomena, been influenced by the law of natural selection which operates so largely in morphological evolution? The answer would seem to be, that natural selection affects only those associated with practical results. To put it in another way, we can say that natural selection is operative so far as perceptual inferences are concerned, but not as to inferences on the conceptual plane. Assuming that a horse or a bird could theorize, it would be their practical activities which would determine their survival or extinction, not the theories they held. Why not so with man? I may hold all sorts of queer theories, but so long as they do not influence my actions they will not affect either my elimination or my survival. According to my practical conduct shall I be eliminated or not. Now, there are several activities of man, the outcome of his emotion, conceptual thought and ideas, which seem to fall outside the influence of natural selection. For instance, the activities associated with art, literature, social legislation

and pure science. In our day, these have all reached gigantic developments, and it is difficult to believe, inasmuch as they are non-adaptive, that they fall under the same laws as govern morphological evolution. If this be so, then how can we explain their evolution? Only on the plea that they are favourable variations and the direct product of an environment of other ideas. Both the artistic and mathematical faculties exist in some degree in all people, they are essentially intellectual and in the former case also emotional. Given an individual endowed with a high order of intellect, it is not surprising that he should find it easier to reason in some departments of thought than in others. Thus, one man may excel in abstract reasoning or in the use of mathematical formulæ; another allows his mind to work in marvellous gradations and combinations of colours and excels as a painter; and another, by virtue of a special development of the auditory side of his mind, has evolved a language of fine shades of tone or pitch and excels as a musician. There is much to warrant the view that these are merely examples of the evolution of intellect or mind on orthodox lines, that is, by the selection of favourable variations; or, as with regard to accessory plumes in some birds, one may consider these excessive mental developments as due to a surplus of strength, vitality and growth power, which is able to expend itself in this way without injury and not without profit. The crucial question is, not why have these variations arisen, but will they survive?

Throughout these speculations, we are dealing with the individual mind and its products. The moral ideals, æsthetic standards and scientific ideas, or even philosophical conceptions of a race or community are merely representative of the general views of the majority, or of the majority of an advanced and cultured minority. In all these cases, the psychical developments or mental products are and must be an individual matter. True, one man can symbolize the ideas that are taking shape in his mind to another, but it is in that other man's mind that they have to make good their claim for acceptance; their acceptance or rejection will depend upon their harmony or discord with the system of ideas among which they are introduced. A difficulty may here present itself to the critical reader, in that some people hold theories or views which to us are mutually antagonistic. They are antagonistic to us, but not to the holder in whose mental environment of a less logical and less coherent system of ideas both find a place, if not as harmonious at least as neutral. In him, a sense of their discordancy is not aroused. It is by the steady operation of this principle that the evolution of thought has

caused and is causing certain ideas such as religious persecution, slavery, the sweating of labour, excessive working hours, faulty housing of the poor and other conditions to present a degree of discordancy which the community signifies as abhorrent. In the same way, mental evolution among the greater number in the social complex has caused other more primitive ideas to seem discordant and repulsive. If we look into the realm of science we find there, too, that each advance of knowledge has been marked by the elimination of inharmonious conceptions. In each and every sphere of mental activity the origin of new ideas, whether ultimately to be deemed harmonious or discordant, is traceable to the cumulative effect of experience and thought, and, as in physical evolution so in pyschological, the law of natural selection has definitely, though perhaps not exclusively, determined the survival of the fittest.

Doubtless, in following these arguments, the reader has had in mind the present-time mental standards of his own race and other Western civilizations. This attitude is both natural and permissible, but it ignores the fuller outlook on the question under consideration. There have been other peoples and civilizations in the past, just as there are other peoples and even civilizations than our own in the present. Each and all have had or have mental systems of their own, which have evolved on similar lines to ours. We pride ourselves on our brain capacity, but we hold no exclusive right to it. Even in the savage, brain evolution has proceeded far; and the savage has elaborated a complex interpretation of Nature and the theory of things. His interpretation may seem discordant, odd and fanciful to us, but for all that it is an interpretation and a system of ideas; to him, the mental attitude of our missionaries is as *bizarre* as his is to the missionary. Looking at man as a whole, what one calls systems of thought or theories of things are merely so many species or genera which have evolved and represent later phases of mental evolution under conditions dissimilar to our own. Just as we approached the subject in respect of the animal, so must we approach it in respect of our fellow men. The brains of a Todo, a Hottentot or a Chinaman are too subtly wrought and our methods too coarse, to enable us to trace the line of their conceptual inferences. All we can do is to interpret their mental processes, through their language or other activities. We do this and label them as totemistic, fetishistic, animistic, as the case may be, but diverse as they seem and are, each is a coherent product of mental evolution from which all that is discordant or inharmonious has been or is being eliminated. In

a similar way, if we think of the great civilizations of the past, such as the Assyrian or Egyptian, we find much in their mental outlook which appears discordant and odd to us; but no more so than our mental outlook would appear odd and inharmonious to them, could they have cognizance of it. Each, in their degree, would wonder how the falsity and discordancy could have had a natural genesis; but, in each case, the falsity and discordancy is not within the system, but between the different systems of ideas. This compels one to say that unless the individuality of mental outlooks be grasped, the true nature of mental evolution cannot be understood. Conceptual ideas can only be measured by other states of conceptual ideas, and these are for the individual subject and not for the multitude. For the savage there is no falsity to Nature in his totemism; the idea is no more discordant to his system of ideas than a ring through his nose or a filed tooth is to his standard of beauty.

This brings us to the question, since only one interpretation of the phenomena can be true surely all others must be false? Certainly, but who is to settle which is false and which is true? The criterion in this and other cases is survival of the fittest. Thoughts, emotions and moral codes are the highest products of mental evolution, and among them there is a struggle for existence or prevalence and, if one may venture to forecast the future, one may say that the ultimate survivor among systems of ideas will be that in which the greatest number of abstract or conceptual ideas are in harmony with concrete or perceptual states of consciousness. Unless some unrecognized fallacy underlies these arguments, we conclude that psychological and morphological evolution proceed on closely analogous lines. Morphological evolution is a matter of structure and activity. If these be not attuned to the environmental conditions, they will be eliminated and those sufficiently well attuned will survive. In the mental world, if conceptual processes or ideas are out of tune with either perceptual inferences or the conceptual ideas of the day they will be eliminated, metaphorically, by natural selection but, actually, by a process of elimination through want of harmony with the spirit of the times. Similarly, that wide range of conduct in man which is the outcome of his conceptual processes, will be and is modified in accordance with the conceptual system of which it is the outcome and outward expression. The abolition of slavery, the Shop Hours Bill, the Eight Hours Bill for miners, the various Factory Acts, and the Acts dealing with the housing of the working classes are the direct evidence of higher ethical standards, the

products of conceptual ideas developing through mental evolution. These developments are and have been essentially subject to the law of the ideas from which they have evolved, namely, the law of survival through fitness and harmony and of elimination through unfitness and discordancy.

Obliged as one has been to give natural selection a subordinate rôle in mental evolution, one is far from prepared to think that it is a negligible factor. In the guise of human selection, through preferential mating, it must play and is playing a big part in the higher phases of human conduct, which, after all, is but man's mind advancing to higher metaphysical conceptions. In this direction the guidance and influence of human selection is unquestionable. Those individuals who have shown the higher types of intellectual thought have been selected constantly for riches, rank, and social distinction. By this means segregation has been effected and intermarriage taken place within this intellectual caste. The result has been the formation of conditions favourable for the inheritance of intellectual qualities. In spite of the intellectual progress of the last three centuries, one is doubtful whether it has originated wholly in fortuitous brain and associated psychical variation which human selection has picked out from the mass of material available. The most that one can admit is evidence of a definite tendency to vary towards a general raising of the intellectual level. Although segregation, through human selection, arranges the individuals in classes, it does not alter the position of the mean around which they vary. If this mean standard of intellectuality has been raised during the last three hundred years, there must have been a tendency to vary in this particular direction; and that tendency has been fostered and helped by a variety of conditions, among which we may more especially mention the inheritance of individual intellectual increments, the great diffusion of knowledge by the printing press and education, and the influence of social codes arising out of an exaggerated communal life.

The effect of education and the printing press in stimulating the conceptual side of man's mind is obvious, but, in this connexion, there is one feature which is peculiarly operative in these present times. It is the synchronous existence of means of rapid and easy inter-communication between continents and peoples. This minimizes the possibility of only one race or group of races profiting by advances in either knowledge or the conceptual inferences from that knowledge. One has referred to the great civilizations of the past; it was the absence of free and rapid means of intercommunication between peoples and continents in their

time which led to their associated intellectual activities being so barren of results, so far as the human race generally was concerned. I do not by this imply that the present generation of man has obtained no benefits from those earlier stages in mental evolution; on the contrary, the influence of such epochs has extended perceptibly to ourselves, and the recognition of this influence is embodied in the familiar adage, that we are the heirs of all the ages. What is manifest is that heritage has been slow in operation and laboriously acquired; in the future everything indicates that intellectual impulses will be rapidly diffused and widely operative.

The influence of social codes on mental evolution is represented by the obligations and restrictions of communal life, which, by the development of huge cities, has had the effect of strengthening individual inhibitory power and to evolve a definite disposition to conform to social codes. This amenability to disciplinary influences, and disposition to observe social obligations has been and is the factor which has contributed more than anything to build up our present-day code of ethics and moral activities. It is the product of that subtly compounded psychosis which constitutes the basis of conscience. Associated with the disciplinary influences of communal life and operative through all time has been the influence of motherhood in developing altruism; and, in this, the sympathetic co-operation of the man has been as essential as the instinctive action of the woman. Without this combination the survival of the children would have been imperilled to the verge of race extinction. In these reflections one is referring mainly to civilized communities within our own range of knowledge and among whom the obligations and restrictions placed upon conduct are more numerous and subtle than prevail in less advanced communities. But, even among the less civilized, we have to recognize the operation of similar, if less exacting, forces. We commit a great error to think of the savage as a wild, irresponsible creature, the sport of every passing impulse. All one's reading indicates the normal uncivilized man to be subjected to far stricter discipline than the average members of civilized communities, and if he fail to conform to the tribal code he carries his life in his hand.

While in uncivilized communities the stress of tribal code and other circumstances of environment have led largely to intellectual evolution by eliminating not only the subnormal in intellect, but also those of average intellect who have had to make way for supernormal types, it is otherwise in civilized communities. In these latter, only those falling definitely below the normal intellectual

standard tend to be eliminated. With us, now, the men of doubtful intelligence have much the same chance of leaving children as others of a higher type. Further, any elimination of the unintellectual, under the stress of competition, has probably been more than compensated by the slower rate of multiplication among the intellectual classes. The total effect of this must be to lower the intellectual standard, but probably the operation of this factor will be neutralized by a steady approximation of the lower class birth-rate to that of the upper classes.

Summarizing this review of comparative psychology, we are justified in saying that a definite line or degree of intellectuality separates the animal from man, and that in human civilized communities the moral and intellectual level is far above that of the uncivilized; still, by the removal of conditions which impelled man to evolve intellectually from the standard of his simian ancestor, intellectual evolution is ceasing or has ceased among the civilized. This does not necessarily imply that mental evolution has ceased among us. To my mind everything points the other way. The fact that we are intolerant of the intemperate, the dishonest, of those who shirk self-sacrifice and the cares of domesticity and parentage, and of those who are devoid of altruism, shows that man is still evolving mentally and will continue to evolve on the moral side. What future developments will be it is rash and presumptuous to speak other than to say that one is confident that they must be towards a closer approximation to the great Ideal One. Already, among the more advanced nations, mankind is grasping that great truth which in former ages was realized only by a few specially gifted ones, namely, the truth that the human race is not detached from and independent of his surroundings. The anthropocentric notions which dominated thought in early times are being replaced by that broader view which makes man a part of Nature; an organism adapted to his environment just like any other organism, but having the supreme advantage of an unlimited adaptability, by virtue of his mental development. We now perceive that this power of adaptation is wholly bound up with a knowledge of Nature's methods; in other words, the present well-being and the future progress of the human race are dependent on an obedience to Nature's laws, and an attitude of mind which recognizes rectitude and fitness only where the greatest good results for the greatest number. It is towards the perfection and universal application of this ethical idea that the mind of man is evolving; and of the manner in which the end will be attained, we may say there are diversities of gifts, but the same spirit.

AN ANALYSIS OF OUR PRESENT POSITION WITH REGARD TO THE PREVENTION AND CURE OF MALARIAL INFECTIONS.

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The malarial parasite was discovered in November, 1880, by Laveran, differentiation of species of the parasite and the asexual life cycle by Golgi and others in 1885.

The conjugation of the sexual forms was described by McAllum in 1897-98, and the sexual cycle by Ross in 1897-98.

These notable dates are mentioned to show how slow has been the completion of our knowledge of the life cycle of these parasites, and to emphasize the fact that now, fourteen years after Ross's famous discovery, we have failed to find efficient means to prevent or cure malarial infections in man.

The hæmamœbæ are a sub-family of the genus sporozoa; these may be defined as unicellular parasites living during a portion of their life in cells and multiplying by the division of the whole or part of the protoplasm into young organisms, commonly called "spores," more correctly called "merozoites" (the young parasite resulting from asexual division). These sporozoa are in their turn members of the family of protozoa; protozoa being defined as unicellular organisms approximating in most of their characteristics to the animal kingdom.

Another sub-family of protozoa is the mastigophora or flagellata, examples of which are spirochætæ, Leishman-Donovan bodies, and trypanosomata. I mention these flagellata because the most recent work of Schaudinn goes far to prove that the distinction between flagellata and sporozoa is not a sound one; that the former have resting forms practically indistinguishable from sporozoa. This fact will have a distinct bearing on the suggestion, which I shall make later, of the possibility of the production of a quinine-fast malarial parasite. Let us now pass to the subject proper of this paper, viz., our present position with regard to the prevention and cure of malarial infections.

To arrive at a fair estimate of our position I first studied the articles on malaria in the handbook on "Tropical Medicine," by Daniels and Wilkinson. I then collected evidence as to results of prophylactic and curative measures from all articles on malaria

appearing in our Journal for the past three years. Finally I have endeavoured to estimate to what extent our anti-malarial measures have failed, and to what causes failure has been due.

To commence with, as far as is known, man is the only animal that ever acts as the intermediate host for the species of parasites which cause malarial fever in man, and therefore mosquitoes—the definitive hosts—derive the parasite from man only, and transmit it to man only. Any break in the sequence will result in the destruction of the parasites, and it is with this in view that all attempts at prophylaxis must be conducted. The sequence in propagation may be broken in the following ways: (1) The parasites in man can be attacked by the use of quinine in all infected persons, so that the chances of the mosquitoes becoming infected are much diminished. Persons may be rendered insusceptible by the free use of quinine, so that even if infected mosquitoes bite them the parasites do not develop. This affords protection to the individual, but either of these measures to be successful requires practically universal dosing with quinine. This is, however, expensive and, except in communities under control, impracticable. (2) Increased protection from mosquito bites by the use of clothing better adapted for protection against mosquitoes, mosquito-proof houses, and more general and intelligent use of mosquito nets, are all measures that under exceptional circumstances may alone prevent infection, and in any case are of great value in diminishing the opportunities for infection either of man or of the mosquito.

In large stations the most satisfactory results are obtained by diminishing the number of definitive hosts, anophelines. A somewhat detailed knowledge of the class of breeding place for the species that carry malaria in each place is required for effective and economical work in this direction. Superficial drainage must be so complete that even during rains the shallow pools formed only last for a day or two, or at any rate not for more than a week; drains must be so graded that with heavy rains they are well flushed, and no pools are left of any depth in the intervals. In all places where there is a hill at the back of the settlement a well-devised intercepting drain must be arranged along the base of the hill, so that flooding from the hill sides will be avoided. This hill water is the main cause of the constant high level of subsoil water; the rain actually falling on the area of the settlement is comparatively unimportant.

As a temporary method the destruction of larvæ by larvicides is of great use, but should not be relied on for permanent purposes.

In countries where the dangerous mosquitoes are stream and river breeders much can be done by removing sedges, reeds and grasses growing into the stream, keeping the banks clear, and removing obstructions in the river bed or sides, so that a uniform flow of water is maintained in the stream. Wet rice cultivation should not be permitted within one mile of any settlement. It is important to have coolie lines and European quarters at some distance from each other, so that infected anophelines cannot readily pass from one to the other.

Having now described fairly fully the methods of malarial prophylaxis as laid down in a standard text-book, I pass to a review of the methods attempted and the results obtained by officers of the Royal Army Medical Corps in tropical countries, and especially in India. I must preface these remarks by saying that endeavours to check malarial infections among military forces only are under discussion; the force chiefly concerned being our European garrison in India, consisting of some 70,000 men.

Lieutenant-Colonel Green, writing on malaria in Nasirabad, shows an admission rate of 137 per mille in 1909 as compared with 586, 511, and 530 per mille in the three preceding years, the rain-fall in 1909 being above the average. The prophylactic issue of quinine was as follows: 10 gr. twice weekly on successive days to British and Native troops, all followers, and children in regimental lines. Quinine was given to infected cases as follows:— 30 gr. daily for five days followed by 15 gr. daily for seven days and 10 gr. twice weekly for three or four months. It should be noted that in this paper, as in many of the others quoted, the actual salt of quinine is not mentioned, and in all such cases it is presumed that the sulphate was used as this is the salt issued in bulk to military hospitals in India. Result: he does not attribute his success to the issue of quinine especially, but to all anti-malarial measures undertaken, including the issue of mosquito nets to two units.

Captain W. Byam wrote on malaria in Kassala in 1909 amongst Egyptian and Arab troops. The author gives figures showing total sick in hospital for all diseases, but states that the variation is practically due to malaria.

The figures show the highest weekly averages in percentages of sick in hospital for the years 1907-1909.

		Egyptian troops		Arab troops	
1907	..	19·5 per cent	..	7·5 per cent	
1908	..	31·5 ,,	..	4·75 ,,	
1909	..	3·2 ,,	..	7·2 ,,	(largely venereal).

The prophylactic issue of quinine was as follows:—

Bi-weekly issue of quinine, 10 gr., commenced well before the malarial season.

He says: "The giving of quinine undoubtedly improved the health of all troops before they were exposed to infection by mosquitoes. That it had a marked protective effect I rather doubt, as on one occasion, when an infected individual arrived in Kassala, three cases of malaria shortly followed among men sleeping near him. I am, therefore, inclined to think that the quinine probably acted more by reducing the sources of infection than by producing immunity in those exposed to it. The cases were all benign tertian in type and reacted readily to quinine. Mosquito nets should be issued to all persons living in barracks. Quinine should be regularly administered to all persons in barracks, as the greatest safety seems to lie in reducing the number of infected mosquitoes rather than in an attempt to produce immunity among troops."

Captain A. B. Smallman described the anti-malaria campaign in Quetta in 1910. He asked: "Has any real reduction in the amount of malaria among British troops taken place in the past twenty years? Reports of the Sanitary Commissioner with the Government of India show a 50 per cent decrease." Smallman, however, considers that this decrease is "probably apparent because (1) cases are treated as out-patients, (2) medical officers will not diagnose malaria unless the parasite is found microscopically." The writer attributes the very slight reduction in the incidence of malaria to "too much reliance being placed on prevention of mosquito breeding, and protection from mosquito bites, and too little on the effective use of quinine." He bases his chief line of attack on "disinfecting infected individuals by means of quinine." He is of opinion that there are no reliable statistics showing the efficacy, claimed by the German and Italian schools, of quinine administered purely prophylactically in doses such as 5 gr. daily or 10 to 15 gr. bi-weekly. His design is to get as far as possible every man who is harbouring the malarial parasite under treatment, and keep him under treatment until he is disinfected by the administration of quinine. Each case under treatment is recorded on a separate "malarial case sheet," and after discharge from hospital each case is treated with quinine for at least four months.

The treatment given to these Quetta cases was uniform and as follows:—While in hospital 10 to 15 gr. ter die, and a dose of mag. sulph. every morning.

The after treatment for benign tertian cases was quinine 10 gr.

daily for one week and then 10 gr. three times a week, a saline aperient once a week. The malignant tertian cases took quinine 10 gr. daily for a month after leaving hospital. All the quinine was given in solution. Out of the 275 cases, the majority diagnosed microscopically, 7·6 per cent had another attack during or shortly after completion of treatment.

The recurrent cases are divided into three classes: (1) Six men had a second manifestation with a different parasite from the original. In three of these cases the second manifestation occurred between three weeks and two months after the completion of the course. In the other three cases the second manifestation was during the course; proving the possibility of fresh infection during a course of quinine.

(2) Twelve men had a second attack with the same variety of parasite in the blood in both attacks; four of these second attacks occurred one month after completion of the course, seven of them three weeks after, and one of them fifteen days after; the author therefore considers them to be re-infections.

(3) Five instances (not five men, for in two, second and third attacks took place) of recurrence during treatment were recorded. One of these was unable to take quinine in solution and took tabloids to the same amount. The author excludes Classes I and II and thus arrives at the figure 1·8 per cent of recurrences in his series.

He further states: "As regards curability of a recurrence as compared to a fresh infection, we have some evidence, for up to the present time with one doubtful exception no case of fresh infection has relapsed during or after treatment. This appears to be in accordance with the now well established fact that the macrogametes, which are destined to become the latent form of the parasite, do not form till after the second or third attacks of the disease. Therefore the chances of a patient being protected from recurrent attacks become less the later the treatment is begun.

"It is becoming increasingly apparent that in carrier diseases our attention must be directed more to the human vehicle of the disease-producing organism and less to external agencies." He lays down that no man must be allowed out of hospital while his peripheral circulation contains sexual forms of the parasite. In malignant tertian infections the larger the number of crescents found, the longer they take to disappear and he gives nine to twenty days as the usual period of persistence. My experience in Kamptee in 1905 to 1906 is that crescents frequently persisted for three weeks and more, in spite of the administration of large doses of quinine.

I can also confirm his statement that the number of crescents found bears no relation to the amount of fever and the severity of the constitutional symptoms. He finally suggests the trial of some of the newer arsenic compounds such as soamin or salvarsan in malignant infections. In this connection the following experiments by Iversen and Tuschinsky are of interest.

In order to test the value of salvarsan in malaria, the writers went to the Caucasus and treated altogether sixty-one cases of malaria, including all three forms of infection. Their conclusions are :—

(1) An intravenous injection of 0·5 gramme of salvarsan exerts a specific effect on all forms of malaria.

(2) The tertian parasites usually disappear from the circulation within forty-eight hours, but the writers cannot say definitely that a recurrence will not take place.

(3) In quartan forms salvarsan has only a slight and temporary effect.

(4) In malignant tertian forms, even when doses up to 0·8 gramme are used, salvarsan only causes a temporary disappearance of the ring parasites from the circulation. The crescents are not affected.

(5) In some cases of malignant tertian malaria salvarsan produces a temporary improvement followed by an aggravation of all the symptoms with a considerable increase in the number of the parasites present.

Crescents in Malignant Tertian Fever.—D. Thomson (*Annals of Tropical Medicine and Parasitology*, April, 1911) gives results of recent studies of crescents by enumerative methods. He finds that crescents appear in the peripheral blood full grown, having developed in the deeper vessels, and the date of their first appearance is ten days after the first appearance of asexual forms in the peripheral blood; these may, of course, precede the onset of fever; since there may be from 2,000 to 10,000 asexual forms per cubic millimetre of blood without fever resulting. The formation of crescents appears to be due to the production of partial immunity, since it is most marked in mild cases, in those of long standing, and in those with a previous history of malarial attacks. Crescent production is also greater in older subjects, and in those whose hæmoglobin is least reduced; there is also some evidence that it is greater in those with a palpably enlarged spleen. The effect of quinine on the production of crescents varies with the dose given; 10 gr. thrice daily is necessary to prevent the formation of crescents from the brood present during its administration, but it has no

effect on crescent production if given two or three days after the paroxysm. Apparently, once an asexual form has taken on sexual characters quinine has no effect whatever in preventing its development into a full-grown gamete. Given in smaller doses, say 5 gr. daily, or irregularly, quinine appears to favour crescent production, possibly by helping the host to produce a certain amount of immunity without definitely killing off all asexual forms. The writer states that quinine given in doses of 20 to 30 gr. daily has never failed to reduce the crescents to below 1 per cubic millimetre within three weeks; this reduction is due not to the action of quinine on the crescents, for of that there appears to be none, but to the fact that the originating spores are destroyed and the crescents themselves when fully developed have only a comparatively short life (three or four days) in the peripheral circulation. Methylene blue in doses 12 gr. daily seems to have even more influence than quinine in preventing crescent formation, though it has little effect in preventing fever. In cases where quinine has not been taken, or has been taken irregularly, crescents appear in the peripheral blood, coming in floods corresponding to the periodicity of their originating asexual forms. If then quinine is given in adequate doses its effect on the crescents will not begin to be noticed till ten days after commencement, since up to that time the crescents which are appearing have originated from asexual forms which were present before the giving of quinine was started.

"Paludism" (the Transactions of the Committee for the Study of Malaria in India).—MacGilchrist, studying the absorbability of quinine and its salts, finds that quinine by the mouth, even in a full stomach, is more readily absorbed than when given hypodermically in the usual dilutions, but when it is well diluted, say 1—150, it is more quickly absorbed when given hypodermically than when given by the mouth.

On the Relation of Injections of Quinine to the Occurrence of Tetanus.—Sir David Semple confirms the results of Vincent published some years ago, that tetanus following an injection of quinine is due not to the injection of tetanus germs, but to the fact that quinine produces a necrotic area in which tetanus spores already in the body find a suitable nidus for growth and the production of toxin. He concludes that injections of quinine are not justifiable unless preceded by a prophylactic injection of anti-tetanic serum.

Quinine as a Malarial Prophylactic.—Captain P. S. Lelean shows that as regards Indian jails, during the quinquennium 1905-1909 there has been an actual increase in the malaria admission

rate. He instances the results of the prophylactic use of quinine in the jails at Peshawar and Dera Ismail Khan. The results in three groups of men of 130 in each group are as follows:—

(*a*) Getting no quinine, admission rate per mille = 476.
(*b*) Getting 5 gr. daily, admission rate per mille = 476.
(*c*) Getting 15 gr. twice weekly, admission rate per mille = 430.

The Inspector-General of Jails attributes the "relative immunity" to malaria of Peshawar prisoners to other factors than quinine prophylaxis, to wit, "sleeping in airy barracks which afford no cover for mosquitoes," whereas the police, in adjacent quarters swarming with mosquitoes, give four times the malarial admission rate of the prisoners.

Again, Gorakhpur and Saharanpur, two usually very unhealthy jails, were selected for special experiment in quinine prophylaxis in 1908. Results:—

	Year	Malarial admissions	Admissions for all other causes
Saharanpur	1907	516	1015
	1908	336	856
	1909	238	638
Reduction since	1907	47 per cent	63 per cent
Gorakhpur	1907	227	945
	1908	233	770
	1909	167	498
Reduction since	1907	26 per cent	47 per cent

It is evident that the general hygienic conditions in these jails have improved to such an extent that the total admissions for causes other than malaria have diminished to a greater extent than the malarial admissions. It is not therefore logical to attribute the reduction in malaria rate to quinine prophylaxis only. He further compares the admission rate for all causes and for malaria, *per mille* in all Indian jails and in the Central and District Lucknow jails, in 1907 and 1908:—

	All Indian Jails		Lucknow Central		Lucknow District	
	Malaria	All causes	Malaria	All causes	Malaria	All causes
1907	191·3	521	27·0	165	72·3	355
1908	197·7	656	8·3	140	46·5	328

It is seen that in 1908, the most malarial season for many years past, the Lucknow Central jail gave an amount of malaria equal to only 4·2 per cent of that of the rest of the jails in India. To what was this attributable? "The jail was three miles from the city, and the Superintendent attributes the exemption from malaria

to the general excellence of the hygienic conditions. . . . No special anti-malaria measures appear to have been adopted, and there was no prophylactic issue of quinine."

It is interesting to make a comparison between this dictum on an 8·3 admission rate and that on a 204·8 admission rate: "I can state without hesitation that the source of immunity, and practically the only source, was the dosage of every prisoner with quinine 15 gr. per week."

He now quotes some apposite figures from the Lucknow city jail, and says: "While quinine prophylaxis was being brought to our notice, and every sanitary canon was meanwhile being outraged by the civil population in the immediate vicinity of the garrison, the malaria admission rate in the city jail was steadily rising and increased 18 per cent in two years:—

1907	Malaria admissions per mille	= 245
1908	,, ,, ,,	= 285·1
1909	,, ,, ,,	= 295·5

The Director of the Malaria Research Laboratory states that, despite the issue of prophylactic quinine to the prisoners in this jail in the autumn of 1909, the blood of 37 per cent of those examined contained malarial parasites.

He then proceeds to give the results of quinine prophylaxis in certain stations of the 7th Division. The doses given varied, and were as follows: 10 gr. on two consecutive days per week, at three-day intervals; at two-day intervals 15 gr. on two consecutive days per week. The experiment was carried out during the malaria seasons of 1909 and 1910.

The admission rates were extremely high in both years. He also points out that though the admission rates are very high, they do not represent the full prevalence of malaria.

In 1909 the malaria admission rate for the British troops in Delhi amounted to 1,144 per mille, but there were also 181 cases of pyrexia of uncertain origin. To the above enormous admission rate we must add cases of malaria treated without admission to hospital. In the whole of India the Sanitary Commissioner in 1909 gave the ratios respectively as 202 : 96, while in Delhi itself an independent observer (Lieutenant-Colonel P. Hehir, I.M.S.) reports: "It is considered that detentions to actual admissions are as $3\frac{1}{2}:1$."

The author then quotes independent reports on the malaria incidence in Delhi Fort in the years 1909 and 1910 by Lieutenant-Colonel P. Hehir and Lieutenant-Colonel J. R. Adie, I.M.S.:—September, 1909: "Of the *Myzomyia culicifacies* captured in the

fort 35 per cent harboured malaria parasites. Of the followers' children in the casement quarters 58 per cent of those examined had malaria parasites in their blood." October, 1910: "Of the followers' children in the fort 43 per cent of those examined had malaria parasites in their blood." It should be noted that during these periods the children of all followers were getting the equivalent of quinine 10 gr. twice or thrice weekly.

"Of 150 men of the garrison doing duty, and not on the sick list, more than one-fourth are carrying about malaria parasites in spite of the large amount of prophylactic quinine that they are taking." "It seems to me that, pending improvements of drainage, you must go in for more and more efficient mechanical protection. I doubt if you can give much more prophylactic quinine, and expect the men to do their ordinary round of duty."

The author concludes that quinine prophylaxis, far from rendering persons "absolutely malaria proof," is really hard put to it for grounds which will even justify its existence. Analyses of quinine samples taken from four different stations proved that it was of excellent quality. The paper concludes with some questions. It has been taught that the action of quinine on the malaria parasite is so certain that it can be relied on for clinical diagnosis. Is this teaching correct? Has quinine lost its specific curative action? If so, is that loss due to increase of resisting power of the parasite to quinine? Has the parasite become quinine-fast?

Apyrexial Malaria Carriers, by Major G. E. F. Stammers, R.A.M.C., and Captain G. I. Davis, I.M.S.—The authors point to the comparative lack of investigation as regards this condition. The carrier may never have had, so far as can be ascertained, any attack of malarial fever, may be in perfect health, and apparently quite fit in every way for full military duty, and yet harbour sexual forms of the parasite in his peripheral circulation. In 1901 Major S. R. Christophers found this condition in 19 out of 86 European soldiers in Mian Mir. Major S. P. James verified this discovery in the same cantonment in 1908. In 1909 medical officers in Ferozepur found 25 carriers among 211 European soldiers. Dr. Bentley found the same condition frequent amongst natives in Bombay. In 1911 (August) the authors found the same condition in 124 out of 957 men of the Royal Irish Fusiliers, who arrived from Ferozepur in November, 1910. All these men were doing full military duty at the time when the positive result was obtained, and in many instances no history of previous malaria could be elicited. The varieties of parasite found were as follows: Malignant tertian, 39;

benign tertian, 84; quartan, 1. In each case an ordinary film and a thick-drop specimen was examined, and six minutes was the average time spent in examining each slide. A fact previously observed was confirmed: that taking quinine in prophylactic doses has no effect on the condition.

On September 10 the whole regiment was put on quinine prophylactically (15 gr. twice weekly on two successive days), and while this had an excellent result in markedly reducing the fresh cases of the disease, it had no appreciable effect on the number of carriers found. After the issue of quinine had been in force for some time it was noted, however, that, in malignant cases, crescents became increasingly more frequent, and rings were not so often found; this is in accord with the generally accepted opinion that quinine in moderate doses is conducive to crescent formation. Another fact worthy of notice is the persistence of the apyrexial carrier for fully a year after the men had left Ferozepur.

The authors also point out that there was not any excessive incidence of malaria in the Royal Welsh Fusiliers, who occupied barracks separated only by a road from those of the Royal Irish Fusiliers, and this in spite of the fact that no prophylactic issue of quinine was made to the Royal Welsh Fusiliers. They attribute this to the domestic habits of the anopheline, *Neocellia stephensi*, which appears to have been the variety most common in the barracks.

Salvarsan and Malaria.—Further notes on the action of this drug appear in the ROYAL ARMY MEDICAL CORPS JOURNAL of August, 1912, the experiments being carried out by Tuschinsky as before. His results are much as previously stated, but he makes the important statement that if smaller doses than 0·5 gr. are given there is some evidence that the parasites become resistant to arsenic.

Value of Quinine as a Malaria Prophylactic, by Captain C. Ryley, R.A.M.C.—"A" and "B" Companies of the Middlesex Regiment, recently arrived in Hong Kong, went to a musketry camp for one month. The men of "A" Company were given quinine 5 gr. daily, "B" Company no quinine: "A" Company had 47 per cent of malarial infections, "B" Company 49 per cent. The diagnosis in every case was verified microscopically.

Cultivation of Malaria Parasites in Vitro.—Bass and Foster have obtained growths of plasmodia from twenty-nine cases of malignant tertian, six benign tertian cases, and one quartan case of ague. Laveran observed malaria parasites in hanging drops

of malarial blood for ten days after its abstraction; other observers have noted that plasmodia live for several days in blood abstracted by leeches from ague patients. Bass and Foster take blood from a vein at the bend of the elbow, mix it with one hundredth of its volume of a 50 per cent watery solution of dextrose (Merck); defibrinate it by gently stirring with a glass rod, and incubate at 40° C. The plasmodia grow on the surface of the precipitated cells in a layer $\frac{1}{50}$ to $\frac{1}{20}$ of an inch thick. Those below the cells die. A rather coarse needle should be used for drawing the blood since aspiration through a fine capillary tube injures the parasites. It is necessary to avoid the admixture of air. For sub-cultures the leucocytes must be removed since the merozoites on leaving the corpuscles are englobed by the white cells. The defibrinated blood is centrifugalized until most of the leucocytes are on the surface of the clot. The serum is withdrawn and is distributed in small test tubes ($\frac{1}{2}$ by 5 in.) to the extent of about $\frac{1}{2}$ or 1 in. column in each. A tenth of a cubic centimetre of blood-cells and plasmodia is taken up from the middle zone of the centrifugalized blood, and is placed at the bottom of the serum in the culture tubes. It is advantageous to use flat-bottomed tubes, or in their absence discs of filter paper on rings of glass tubing may be used to receive the layer of cells. Sub-cultures should be made every forty-eight hours. The plasmodia grow in the red corpuscles. They are destroyed in a few minutes by human serum from any source. They can exist in red cells immersed in Locke's fluid without the calcium chloride. Locke's fluid consists of a solution of the salts which occur in the blood, in the proportion in which they are present. The asexual cycles *in vivo* and *in vitro* are identical. The sexual forms do not appear to grow in cultures. The *Plasmodium vivax* and *P. falciparum* are distinct species. The latter is easier to cultivate. The generation period may vary from thirty hours to four days according to the temperature at which the cultures are incubated. Calcium salts added to cultures of the malignant tertian parasites cause lysis of the infected corpuscles. The authors suggest that hæmoglobinuria may arise from an excess of lime in the blood. They state that hæmoglobinuria has disappeared from certain localities when lime-free water has been substituted for a lime-containing supply.

Studies in Relation to Malaria (Samuel Darling, Isthmian Canal Commission).—In various biting experiments, in which counts were made from blood films taken simultaneously with the biting, it was estimated that only 3 per cent of the female

gametes became zygotes, and that the remaining 97 per cent were probably phagocyted in the mosquito's mid-gut.

He further states that observations *in vitro* show that fully 50 per cent of gametes are phagocyted by polynuclear leucocytes. In other experiments made to discover the limits of infectiousness in man, it was estimated that a proportion of 1 gamete to 500 leucocytes, or 12 gametes per cubic millimetre, constituted a dangerous degree of infectivity. Experiments on larvicides showed that crude petroleum was frequently too viscid to have a spreading power of the highest efficiency. Darling recommends crude carbolic having a specific gravity not greater than 0·96, and containing 20 per cent of phenols or tar acids; made into a soap with common resin and an alkali, it diffused perfectly with water, forming a milky emulsion very destructive to mosquito larvæ and having a germicidal value equal to or greater than that of pure carbolic or a Rideal-Walker coefficient of one to two.

In a dilution of 1—15,000 it kills full-grown anopheles larvæ in 123 minutes. Wire for screening, if only required to protect against anophelines, should be of No. 16 mesh or sixteen holes to the inch. The wire used should have a composition as follows: copper 65 per cent, zinc 34 per cent, iron 1 per cent; this withstands moist heat best.

Effect of Quinine on Malarial Parasites (a) *in the Mosquito,* (b) *in Man.*—(*a*) Nearly all the infecting experiments were conducted on patients receiving quinine, 10 gr. thrice daily in solution. This amount has apparently no inhibitive effect on the parasites in the mosquito, as the zygotes go on to maturity and the sporozoites appear in the salivary gland in from nine to twelve days.

(*b*) It is concluded that the above-named doses will gradually reduce the sexual form of the parasite in man to a non-infective minimum in from a few days to a few weeks, according to the severity of the infection. This result is due to the destruction of the young ring forms, and not to any direct effect on the already mature gametes.

Latent Malaria among Labourers and their Families.—The investigations were made during the dry season, when very few mosquitoes were breeding. In two localities no mosquitoes were breeding and none were caught in the barracks occupied by the labourers. On one day blood specimens were taken between 5 and 6 p.m., when the men were coming out from supper; 237 specimens, taken from 269 labourers, showed twenty-nine cases of latent malaria.

Amongst fifty-three labourers living in screened quarters the blood of seven contained malaria parasites, six showing benign tertian and one the malignant tertian variety, = 13·2 per cent.

From examination of labourers at work, 8—13 per cent of latent malaria was found, in the proportion of four benign tertian to one malignant tertian. Amongst adults and children living in unscreened or recently screened quarters the percentage of latent malaria was much higher.

It is this latent, untreated malaria in every tropical community which contributes largely to the preservation of the malaria parasite, and to the infection of anophelines, when after the onset of the rainy season mosquitoes in numbers have begun to breed.

The degree of splenic enlargement seems to depend on the following factors: (*a*) amount of blood destruction or loss, (*b*) duration of the blood destruction, (*c*) ability of the hæmapoietic organs to regenerate red blood cells, (*d*) degree of reaction to the infection.

The Development of a Quinine-resisting Strain of Malaria Parasite (Dr. Arthur Neiva).—The observations were made for twenty months on 3,000 men, who were occupied in building water-works in an extremely malarious district in Brazil. The following are some of his observations: (1) Persons, who had taken quinine regularly and remained free from malaria while in the affected area, suffered from attacks of malarial fever on giving up the regular use of quinine after their return to healthy districts.

(2) In order to obtain the same therapeutic effect the dose of quinine had to be increased in proportion to the length of exposure to infection. The district was extremely swampy, and in many parts the men had to work up to their waists in water. The usual hours worked were fourteen a day, divided into eleven hours on a day shift and three hours on a night shift. The sleeping accommodation consisted of open grass huts. Under these circumstances the only available means of combating malaria was the regular administration of quinine. At first there was much opposition among the men, and many of their families refused to take quinine.

From February till the middle of August a certain number of men were attacked by malarial fever, a large proportion being primary infections. These men had been taking quinine regularly. The same thing happened in September, although in general the quinine prophylaxis was successful; the families, on the other hand, suffered severely from malaria. Thus there were two classes of persons living in close proximity: the workmen protected by quinine, and the families, traders, &c., who refused to take quinine

and were saturated with malaria; men who had taken quinine regularly, and had never had fever while in infected districts, developed definite attacks soon after their arrival in Rio.

In October it was decided to give all men quinine three times a week instead of twice a week as before. This stopped all attacks of fever among men at work, but did not prevent the occurrence of attacks among men returning to Rio.

By the middle of November malarial fever began to attack men who were taking quinine three times a week. It was therefore ordered to be taken daily. This stopped the attacks, but still men returning to Rio were attacked. Dr. Neiva thinks that the only possible conclusion is that a strain of malaria parasite strongly resistant to quinine has been produced, and in the following way: The anopheles fed in turn upon the blood of local inhabitants, who formed the original source of infection, on the new-comer who had not taken any quinine, and on the workmen who were taking quinine every third day.

In this way the hæmatozoa were given the opportunity of becoming acclimatized to quinine, and in the course of many generations acquired a very high resistance to it. In January, 1908, about 10 per cent of some of the detachments had become gamete carriers. These persons were taking the same amount of quinine as non-infected men, so that an anopheles feeding on either of these classes always drew blood containing approximately the same amount of quinine, and the parasite consequently became acclimatized, and was soon able to complete its developmental cycle in the presence of quinine. The quinine-resisting powers of the parasite were thus being constantly raised. Any intermission in taking the daily dose of quinine, even up to months after leaving this infected district, was followed by a sharp attack of malignant tertian fever.

Dr. Neiva draws the conclusion that if the prophylactic use of quinine is to be successful it must be enforced on every person living in the district.

We are now in a position to study the results of anti-malaria measures as evidenced by personal experience, and that of others as quoted in the above papers. To take first measures directed toward the prevention of breeding of mosquitoes. I think it must be admitted at once that these measures have not proved efficacious to any marked extent in Indian cantonments. As far as I am aware, the most extensive anti-mosquito campaign which has been carried out in India has been in Mian Mir and the results have not been in any way comparable to those obtained in Ismailia. To

those of us who have served in India, I think the reasons for our comparative failure are obvious. Firstly, the topographical and climatic conditions in the majority of Indian cantonments are in no way comparable to those in Ismailia. Secondly, the funds available have been totally inadequate. In proof of this it is only necessary to read the "Report on the Present Condition of Ismailia as Regards Malarial Fever," which appeared in the CORPS JOURNAL of April, 1911. Here is a town of 10,000 inhabitants, situated in a rainless climate, and isolated in the desert. The only source of water suitable for the breeding of mosquitoes is the Sweet Water Canal, which breaks up into several streams in the immediate neighbourhood of the town, forming a few shallow marshes which were easily drained. I do not know the cost of the original anti-mosquito measures carried out under the advice of Sir Ronald Ross in 1902. It is admitted, however, that the continuous work necessary to keep Ismailia mosquito free costs £1,000 a year, representing an annual tax of less than 2 francs per head, which the Suez Canal Company gladly pays. Again the Suez Canal Company is all-powerful in Ismailia. The inhabitants, with the exception of a few natives and minor Government officials, are employees of the Company. There, regulations made are readily enforced. Compare these conditions with those of the average Indian cantonment, and it will be obvious how enormous would be the cost of destroying all the mosquito-breeding foci in a comparatively small cantonment, to say nothing of the cost of the upkeep of such works. It is not to be expected that the Government of India would sanction such expenditure except on the advice of a Board of experts, armed with full knowledge of the results likely to be obtained. I would suggest, however, that such a Board be formed, that it should consist of a member of the Indian Civil Service, especially expert in land valuation; a member of the Public Works Department, especially expert in canal and irrigation works, and a medical officer especially expert in malarial research work. The Board would proceed to investigate the malarial conditions in some small but malarious cantonment. The medical officer would investigate the mosquito-breeding grounds and the varieties of mosquitoes most prevalent. The P.W.D. officer would advise on the drainage of suitable areas, the provision of sluices to allow of intermittent irrigation where necessary, and would estimate both the initial cost and the probable cost of upkeep of such work. The I.C.S. officer would decide what compensation should be granted for taking out of cultivation

plots of land such as market gardens, peach gardens, &c., situated dangerously near cantonments. The work should then be carried out, and the results during the subsequent two or three years noted, both as regards the prevalence of mosquitoes and the incidence of malaria, amongst both the civil and military population. During the period of observation all other methods of malaria prophylaxis should be held in abeyance, so as not to confuse the results. By such an experiment alone could the result of anti-mosquito methods be estimated, and reliable data obtained as to the justifiable expenditure on such measures. So much for anti-mosquito measures on a large scale, which cannot be said to have been so far seriously tested in Indian cantonments. Minor works of this nature have without doubt been tested in nearly every Indian cantonment during the past seven or eight years. Gangs of natives have been set to work under European supervision. The immediate neighbourhood of barracks and private compounds has been systematically visited, superficial drains cut, luxuriant vegetation removed, compounds cleared of broken pots, empty tins, &c., pools and *diggis* oiled, and holes in broken ground filled in. No doubt these organized attempts have had some salutary result, and they should be persevered in with ever increasing vigour, and to the utmost limit to which finances permit. Few, however, who have served in India will deny how discouraging are the results; how after continuous labour one is continually finding fresh breeding grounds in the very areas which one thought were free from them. We must, I think, admit that we cannot hope by anti-mosquito measures alone to protect the population of the average Indian cantonment from malarial infection.

Mechanical Protection from Mosquitoes.—The means at our disposal are two, viz.: Screening the habitations by means of wire gauze, and the individual use of the mosquito net. Screening of barracks, &c., by means of wire gauze has the following drawbacks. It would be very expensive, it would gravely interfere with ventilation, it would render the atmospheric temperature in the rooms, already oppressive enough, during the rains almost unbearable. It would render necessary that abomination the spring door, which invariably gets broken. Many of us are familiar with the very partial success of wire doors and windows in keeping flies out of the Indian cook-house; how can we therefore expect to exclude by such means the infinitely more elusive anopheline from our barrack-rooms? The individual use of the mosquito net has had many advocates, and undoubtedly when properly used and kept in

repair it will protect. Personally, I am of opinion that the efficient use of the mosquito net by soldiers in the aggregate will never, and can never, be attained.

We come now to quinine prophylaxis, and quinine as a curative agent.

I think everyone who has experience of the treatment and prophylaxis of malaria by the exhibition of quinine will agree that so far, in India, it has lamentably failed. To what then are we to attribute this failure? Is this much-vaunted remedy useless, or are we using it wrongly? I think our failure must be definitely attributed to lack of proper investigation of the therapeutical action of quinine. The position of affairs has been well described by a sanitary officer of the Pindi Division when he says: "For some years indeed investigatory work is more needed than any other form of energy." I am aware that such investigatory work has been begun, on obviously the right lines, by the formation of a Malaria Commission at Simla. There have been occasional extracts in the CORPS JOURNAL from reports so far published by this Commission, and though I have not had access to the actual reports themselves, I have no doubt these extracts have included the most important findings of the Commission up to date. The following are some of the lines of investigation which suggest themselves to me:—

(1) The rate of absorption of the various chemical compounds of quinine in common use.

(2) The chemical condition in which these compounds reach the blood, and the method of their excretion.

(3) The effect of quinine on (*a*) the blood serum, (*b*) the red blood cells, and (*c*) the phagocytes. There appears to be some evidence that quinine to some extent interferes with, if it does not even temporarily inhibit, phagocytosis. If, as has been suggested, the ultimate destruction of the malaria parasite in the blood is the duty of the phagocyte, it is obvious that anything which interferes with the activity of these cells must equally interfere with the destruction of the malaria parasite.

Experiments are needed to test the effect of the ingestion of quinine on (*a*) opsonic phagocytosis and (b) spontaneous phagocytosis. The methods of measuring opsonic power are most graphically described in Chapter IX of Sir Almroth Wright's "Technique of the Teat and the Capillary Glass Tube." Should we find that the ingestion of quinine adversely affects the opsonic power of the blood on bacteria, we might justifiably infer a similar effect as

regards the malarial parasite. We next come to the possibility of the production of a quinine-fast malaria parasite. We have definite evidence of the production of an arsenic resistant strain of trypanosome by the treatment of animals infected by trypanosomata, with various arsenic compounds. We have Schaudinn's dictum that the distinction between flagellata and sporozoa is probably unsound. It would, therefore, seem not unlikely that by giving an individual whose blood is infected by malaria parasites comparatively small doses of quinine over long periods we may produce a quinine-resistant strain of parasite. We know that individuals, actually taking quinine in ordinary medicinal doses daily, may actually be harbouring even the so-called benign tertian parasite in their peripheral blood. If we can show that uninfected individuals, recently arrived in a tropical climate, and taking quinine regularly, can be infected by means of mosquitoes which have been previously fed on one of these malaria carriers, we shall have gone far to prove that a quinine-resistant parasite has been produced.

Now that Bass and Foster have succeeded in cultivating malaria parasites *in viiro*, it would be interesting to test the results of injection of sub-cultures into the uninfected human being. Should we find that malarial infection could thus be produced, it would suggest that the sexual forms of the parasite are merely produced when the asexual forms are threatened with extinction, as the result of the presence in the blood of hostile elements, be they salts of quinine or antibodies. This theory derives some confirmation from the observations that sexual forms only appear in the blood after comparatively prolonged infection, or as the result of prolonged dosage with small quantities of quinine. The possibility of producing a protective vaccine from sub-cultures of the parasite also suggests itself. As malarial fevers are now responsible for the greatest amount of inefficiency both in our British and Native armies in India, I venture to hope that this analysis of our position may not be without some value.

Clinical and other Notes.

A RARE CONDITION GIVING RISE TO ACUTE ABDOMINAL SYMPTOMS.

By Lieutenants A. HOOD and J. L. RITCHIE.
Royal Army Medical Corps.

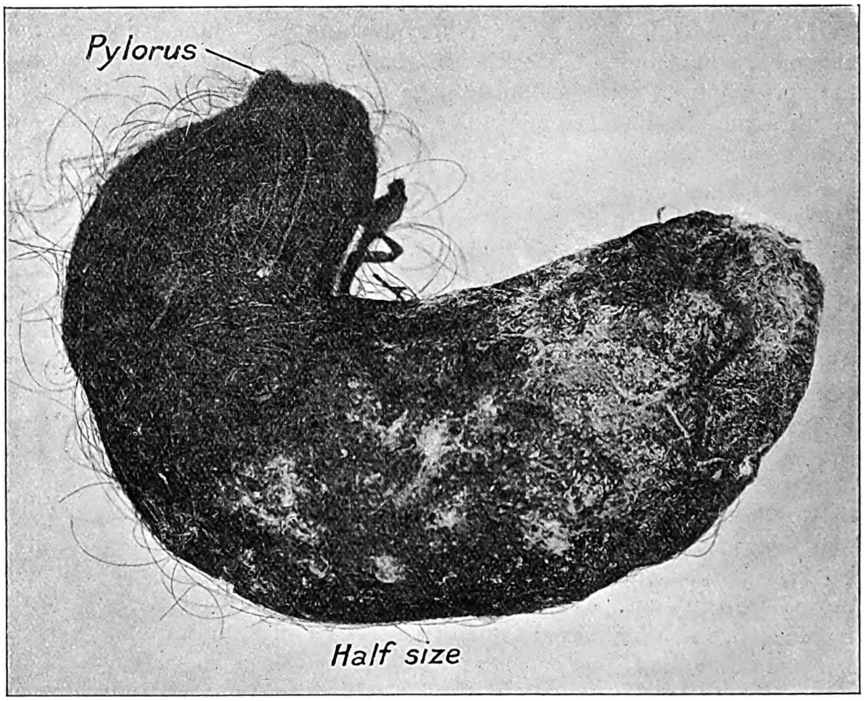
M. C., aged 7 years 4 months, complained of acute pains in the abdomen, coming on at irregular intervals, and so severe as to double her up. She was born in India, but had not had any illness there; in South Africa she had dysentery five years ago and measles in England. Her parents stated that she always had a "weak stomach," but on the whole took her food well up to one week previously, since when her appetite had entirely left her, and she would not eat anything. Four and a half years ago her mother noticed that she had developed an abnormal appetite, eating almost anything she could lay her hands on, e.g., pieces of string, tags of blankets, and large amounts of her own hair. On several occasions the mother had seen large pieces of string passed in the child's stools and quantities of hair. This abnormal appetite had, to the best of her parent's belief, disappeared, and for over two years her mother had seen nothing abnormal in the stools; but the father states that she is very "cute," and might quite well have continued her depraved taste unknown to her parents. She has sunken eyes and looks old for her years, but she is very sharp and answers questions readily and intelligently.

Present Condition.—Temperature 98·4° F. Pulse 88. Bowels had not moved for two days. On examination the abdomen moved freely with respiration, and when asked to point to the seat of pain the child placed her hand over the region of the umbilicus. On close inspection a slight fullness could be detected in the epigastric region, but no limitation in movement during respiration could be observed. The lower part of the abdomen was soft and non-sensitive, and the same was true for the area round the umbilicus.

Occupying the position of the fullness described above there was a hard mass not tender to touch and moving with respiration. Towards the middle line the upper limit of the mass could be felt, but as it was followed out to the left it passed upwards under the ribs and could only be defined by percussion. Above it reached the level of the seventh costal cartilage, about 3 in. from the middle line. Below the mass could be easily defined with the fingers, and reached to 2 in. from the umbilicus at its lowest point. It gave a dull note all over. The spleen was normal and the lower margin of the mass regular and smooth. There was no free

fluid present in the abdomen. An enema was given with a satisfactory result, and hot fomentations were ordered for the relief of the pain. On the following day the condition was unchanged, and she had several exacerbations of pain during the night.

From the history and the presence of the mass occupying the position of the stomach the diagnosis of hair-ball in the stomach was made, the next most likely condition being a sarcoma of the liver. Lieutenant-Colonel W. H. Starr, R.A.M.C., saw her and concurred in the diagnosis.



She was removed the same afternoon to a civil hospital. The condition remained much the same, and on the second day after admission laparotomy was performed through a large median vertical incision from the xiphisternum to below the umbilicus. A movable mass was felt in the stomach; the latter being opened the large hair-ball shown in the photograph was readily extracted. Except for a slight stitch abscess in the lower angle of the wound convalescence was uninterrupted.

Mr. Seymour Barling, F.R.C.S., consulting surgeon to the hospital, operated at the parent's wish, and to him we are indebted for the photograph reproduced.

SHORT SUMMARY OF THE WORK AT THE LOUISE MARGARET HOSPITAL, ALDERSHOT, DURING THE YEAR 1912, WITH NOTES AND REMARKS ON THE MORE IMPORTANT CASES.

By Major E. Ryan.
Royal Army Medical Corps.

(1) The number of maternity cases admitted was 519, consisting of 325 multiparæ, 194 primaparæ. Of these there were 511 vertex presentations, 18 breech, 2 transverse, 1 face. Total number of infants, 532. Of the 532 infants born there were 279 males, 253 females.

There were 2 sets of triplets, 9 sets of twins, 13 stillbirths, 11 persistent occipito-posterior cases, 13 premature births, 3 cases of adherent placenta, 1 case of placenta prævia, 2 cases of albuminuria, 2 cases of induction of labour, 9 cases in which forceps had to be applied, 1 case of version performed, 1 case of prolapse of cord, 1 case of eclampsia, 1 case of placenta succinturiata.

Of the stillbirths 8 were macerated, 3 were premature, 1 prolapse of cord, 1 torsion of cord which was tightly wrapped round the neck and body of child several times.

Malformations of Infants.—There were 3 cases, viz., 1 exomphalos, 1 hare lip and cleft palate complete, and one case of deficiency of fingers.

There was no death amongst the maternity patients.

(2) The number of cases admitted for general diseases was 591; 202 women, 389 children. The total admissions during the year, including both maternity and general cases, were 1,110.

(3) The number of women and children who attended as out-patients on Tuesdays for extraction of teeth was 164. Of these 90 had nitrous oxide gas.

(4) The number of attendances of women (special gynæcological out-patients) on Thursdays was 410.

(5) The number of major and minor surgical operations performed during the year was 443, with 6 fatal results (see below). Of these the abdominal operations were 86, and the miscellaneous operations 357.

(6) List of Surgical Operations.

		Results				
Nature of operation	Number of cases	Successful	Partly successful	Failed	Died	Remarks
A. Abdominal operations :—						
(1) Excision of vermiform appendix for appendicitis	28	27	—	—	1	For particulars, see notes following list of operations.
(2) Gastrojejunostomy ..	1	1	—	—	—	For chronic gastric ulcer.

Nature of operation	Number of cases	Results: Successful	Partly successful	Failed	Died	Remarks
(3) Operations for removal of ovaries, Fallopian tubes, &c.	25	25	—	—	—	See notes below.
(4) Supra-vaginal hysterectomy	9	9	—	—	—	,, ,,
(5) Intussusception ..	1	1	—	—	—	,, ,,
(6) Operation for ectopic gestation	1	1	—	—	—	,, ,,
(7) Operation for ventral suspension	1	1	—	—	—	,, ,,
(8) Radical cure — umbilical hernia	2	2	—	—	—	One was an officer's child operated on in quarters, not shown as an admission in hospital.
(9) Ventral hernia	1	1	—	—	—	—
(10) Inguinal hernia ..	14	14	—	—	—	—
(11) Exploratory laparotomy	3	2	—	—	1	See notes.
Total abdominal operations ..	86	84	—	—	2	

There were two deaths amongst the abdominal cases, which are noted below.

B. The miscellaneous operations were as follows, and of the 357 there were 4 deaths, 1 from acute osteo-myelitis, 1 case of removal of encephalocele, 1 from mastoid abscess, and 1 from spina bifida.

Brought forward—Abdominal operations	86	84	—	—	2	—
Miscellaneous operations :—						
Circumcisions	80	80	—	—	—	For phimosis.
Removal of "cysts" by dissection	4	4	—	—	—	Four sebaceous cysts.
Excision of nævi	6	6	—	—	—	—
Cauterization of nævi ..	5	5	—	—	—	By the "Pantostat."
Excision of varicose veins ..	6	6	—	—	—	—
Excision of internal piles ..	3	3	—	—	—	—
Operation for fistula in ano	2	2	—	—	—	One fistula was complete.
Operation for osteo-myelitis	3	1	—	1	1	The case that died was one of acute infective osteo-myelitis.
Removal of foreign bodies ..	10	10	—	—	—	Nine were needles and one was a boot-button impacted in nasal pharynx.
Operation for removal of encephalocele	1	—	—	—	1	This child also had hydrocephalus.
Removal of breast for carcinoma	3	3	—	—	—	—

Nature of operation	Number of cases	Results: Successful	Partly successful	Failed	Died	Remarks
Excision for elongated and adherent uvula	1	1	—	—	—	—
Operation for removal of exostosis	1	1	—	—	—	—
Operation for tubercular joints	2	2	—	—	—	—
Operation for tubercular glands	6	6	—	—	—	—
Excision of glands	6	6	—	—	—	—
Abscess connective tissue ..	12	12	—	—	—	—
Caries of rib	4	3	—	1	—	—
Plastic operation for webbed fingers	1	1	—	—	—	—
Suppurating bursa patella ..	2	2	—	—	—	—
Suppurating balanitis ..	2	2	—	—	—	—
Abscess of breast	2	2	—	—	—	—
Whitlow of finger	1	1	—	—	—	—
Ischio-rectal abscess ..	2	2	—	—	—	One was tubercular.
Mastoid abscess	3	2	—	—	1	See notes.
Operation for spina bifida ..	1	—	—	—	1	—
Operation for removal of ranula	1	1	—	—	—	—
Operation for removal of adenoids	39	39	—	—	—	—
Removal of adenoids and hypertrophy of tonsils	66	66	—	—	—	—
Removal of tonsils	33	33	—	—	—	—
Removal of uterine polypus	2	2	—	—	—	Through the vagina.
Dilatation of cervical canal and internal os	1	1	—	—	—	For spasmodic dysmenorrhœa.
Curetting of uterus.. ..	30	30	—	—	—	See notes.
Operation for ankylosis of elbow joints	1	—	1	—	—	—
Operation for repair of old ruptured perineum	1	1	—	—	—	—
Removal of papilloma of breast	1	1	—	—	—	—
Cephalo-hæmatoma.. ..	1	1	—	—	—	—
Removal of adherent placenta	3	3	—	—	—	—
Induction of premature labour	2	2	—	—	—	One for albuminuria, the other for placenta prævia
Excision of lipoma	1	1	—	—	—	—
Excision of ganglions ..	3	3	—	—	—	—
Excision of urethral caruncle	1	1	—	—	—	—
Excision of Bartholin's cyst	1	1	—	—	—	—
Uterus emptied for inevitable abortion	1	1	—	—	—	—
Total operations ..	443	434	1	2	6	—

NOTES ON SOME OF THE MORE IMPORTANT CASES.

(1) Of the 28 cases of appendicitis, 24 cases healed by first intention, 1 developed a stitch abscess, in 3 cases drainage was employed, and one of the latter cases died of severe toxæmia. In 7 cases the appendix was gangrenous accompanied by peritonitis, one being an officer's wife who was operated on in her own quarters. In 7 others the appendix contained fæcal concretions. In 3 others the appendix contained thread worms. In 3 others the appendix was acutely inflamed, elongated, and adherent to cysts of the right ovaries, which were also removed, one of these cases also being an officer's wife who was operated on in her own house. One case was tubercular and was associated with a large number of isolated tubercular glands throughout the mesentery. In 3 other cases there were extensive adhesions and kinking. In another case the appendix was full of pus, and in 2 other cases perforation had taken place and fæcal concretions were found in the abscess.

The fatal case referred to above was a girl aged 10. She was operated upon on the morning after admission; the abdomen contained a large quantity of fœtid pus, the intestines were acutely congested and matted together, and the appendix, which was gangrenous, was removed. Died four days after the operation.

(2) *Gastro-jejunostomy.*—This was a case of chronic gastric ulcer which had not yielded to medical treatment. The jejunum was short-circuited to the posterior wall of the stomach, no attempt being made to deal with the ulcer, which was very thickened.

(3) *Operations for Removal of Ovaries and Fallopian Tubes.*—These numbered 25. All were successful and healed by first intention. Of these, 11 cases were simple cysts, 8 being unilocular and 3 multilocular, necessitating ovariotomy, besides the following cases which are given more in detail.

Case 12.—Mrs. G., aged 23. Right hydrosalpinx with cystic left ovary. Operation: Removal of right tube and left ovary.

Case 13.—Mrs. D., aged 41. Large dermoid cyst of left ovary and multilocular cyst of right ovary. Operation: Both tubes and ovaries removed with cysts.

Case 14.—Mrs. M., aged 30. Multiple cysts of both ovaries with double salpingitis. Operation: Both tubes and ovaries removed.

Case 15.—Mrs. B., aged 27. Multilocular cysts of both ovaries, with left tube and ovary adherent to large intestine. Operation: Adhesions were broken down and both tubes and ovaries removed.

Case 16.—Mrs. H., aged 26. Multiple cysts of right ovary to which the appendix was adherent. Operation: Removal of right tube and ovary as well as the appendix.

Case 17.—Mrs. G., aged 24. This was similar to Case 16; the appendix was also removed. These two cases are not included in the number of operations for appendicitis already given.

Case 18.—Mrs. P., aged 36. Double hæmatosalpinx. Operation: Both tubes removed.

Case 19.—Mrs. P., aged 26. Similar to cases 16 and 17. Appendix likewise removed.

Case 20.—Mrs. G., aged 28. Double tubo-ovarian cysts. Removal of both tubes and ovaries. The remaining five cases were single or double pyosalpinx necessitating removal of one or both tubes.

(4) *Abdominal Hysterectomies.*—There were 9 supra-vaginal hysterectomies, all of which were successful.

Case 1.—Mrs. B., aged 53. Large multilocular cysts of both ovaries and four intramural fibroids of uterus. Operation: Supra-vaginal hysterectomy with removal of tubes and ovaries.

Case 2.—Mrs. P., aged 29. Left hæmatosalpinx with chronically inflamed uterus. Operation as above.

Case 3.—Mrs. W., aged 40. Chronic prolapse of uterus. Operation: Supra-vaginal hysterectomy.

Case 4.—Mrs. A., aged 38. Large fibroid of uterus. Operation: Supra-vaginal hysterectomy.

Case 5.—Mrs. O. R. (officer's wife). Cysts of both ovaries and chronic metritis with retroflexion. Supra-vaginal hysterectomy, also removal of tubes and ovaries. (This operation was done in patient's house.)

Case 6.—Mrs. B., aged 37. Cystic disease of both ovaries with chronic endometritis. Operation: Supra-vaginal hysterectomy with removal of tubes and ovaries.

Case 7.—Mrs. I., aged 22. A large cyst in the broad ligament of the right side. This cyst occupied the pelvic cavity, completely displacing the uterus. In attempting to get the cyst out of the cavity, its wall burst allowing part of its purulent contents to escape. The uterus itself was in such a chronic state of hyperplasia that supra-vaginal hysterectomy was done as well as removal of the right ovary and cyst. Notwithstanding the escape of pus into the pelvic cavity the incision healed by first intention.

Case 8.—Mrs. G., aged 26. Continuous pain for months, acute retroflexion and prolapse of uterus. The appendix was inflamed, elongated, and adherent to the retroflexed uterus in Douglas's pouch. Operation: Supra-vaginal hysterectomy as well as removal of appendix.

Case 9.—Mrs. I., aged 38. Large fibroid of uterus. Operation: Supra-vaginal hysterectomy.

(5) *Intussusception.*—There was only one case, a girl aged 11 months. The intussusception consisted of the cæcum and a portion of the ileum as well as the vermiform appendix. Stovaine was the anæsthetic employed in this case as the child was very collapsed on admission. After the operation she made an uninterrupted recovery.

(6) *Operation for Ectopic Gestation.*—There was only one, which was a most interesting case. Mrs. S., aged 26. Married seven years, has

one child aged 6. Since then menstruation had been regular up to three months before admission to hospital. On admission she was very pallid and collapsed, so much so that hot salines were given *per rectum* while she was being prepared for operation, which took place within one hour after admission to hospital. On the abdomen being opened there was a great gush of blood out of the incision. There was a "twin ectopic" which had implanted itself in the right Fallopian tube. This had recently ruptured giving rise to very profuse bleeding. The right tube was removed and the patient made an uninterrupted recovery. The twin specimen corresponded to a three months' pregnancy.

(7) *Operation for Ventral Fixation.*—One case.

Case.—Mrs. M., aged 29. Had an operation for anterior colporrhaphy done a few months before coming to Aldershot. On admission to this hospital she was suffering from intense pain, retroflexion and prolapse of uterus. Operation: Ventral suspension. This patient came to see me as an out-patient. She is absolutely free from pain and there is not any sign of prolapse.

(8) *Radical Cure.*—Umbilical hernia, 2 cases; ventral hernia, 1 case; inguinal hernia, 14 cases. In two of the latter the appendix was found in the sac and removed, in another case (a child aged 10) an ovary was found but not removed.

(9) *Exploratory Laparotomy.*—Three cases; 2 successful, 1 died. The case that died was one of empyema which was drained at the angle of the scapula. The abdomen became infected by pus descending beneath the diaphragm. The abdomen was opened and drained, but death ensued a few days afterwards from sapræmia. The two other cases were for suspected gall-stones and impacted ureteric calculus respectively.

(10) *Mastoid Disease.*—There were 3 cases; 2 were successful, 1 died. Operation: Modified Stacke's. The case that died developed septic meningitis and died three days after the operation.

(11) *Curetting of Uterus.*—There were 30 cases, including endometritis, removal of placental remains following incomplete abortion, hæmorrhagic metrorrhagia, and spasmodic dysmenorrhœa.

HINTS ON TAKING OVER COMMAND OF A STATION HOSPITAL FOR BRITISH TROOPS IN INDIA.

By Captain A. C. ELLIOTT.
Royal Army Medical Corps.

This article is submitted in the hopes that it may be of use to junior officers who may be called upon to take over charge of a small station hospital in India without having had any previous experience in the matter of running a hospital at home or abroad. It is possible that such officers, after their arrival in India, through pressure of work in the

wards and lines, may not have had time to take advantage of opportunities to consider the question of hospital administration—studded as it is with intricacies. While admitting that common sense must play a large part in overcoming many of these intricacies, the writer wishes to offer as an excuse for submitting these suggestions the fact that the regulations, which govern this line of administration, are numerous and scattered through various volumes of regulations, standing orders, circular memoranda, &c.

When called upon to take over charge of a station hospital from another officer it is advisable to communicate with that officer with a view to arranging a definite order in which to carry out the handing over and taking over charge. The following order of procedure is suggested, though no doubt it is open to criticism. Under many of the headings particulars are elaborated and they are associated in addition with criticisms and suggestions.

(*A*) *For Regulations re Transfer of Charge, vide* A.R.I.,[1] vol. ii, para. 170, in conjunction with I.A.F.[2] Z. 2,081.

(*B*) *Books.*—For a list of authorized books, *vide* Army Tables Medical (India), Section VI, Table XXXII. These books should be up to date and should be accounted for on I.A.F. M. 1224 (Surgical Equipment Ledger). Other books include:—

Syphilis Register (in connexion with which *vide* I.A.O.,[3] 307, dated May 20, 1912).
Anti-typhoid Inoculation Register—manuscript.
Vaccination Registers (Army Book 28).
Enteric Registers—manuscript.
Malaria Registers (hospital records)—manuscript.
Malaria Registers (for each unit)--manuscript.
Record of Operations.
Admission and Discharge Book (Army Book 27)—cases.
Admitted to Hospital.
Admission and Discharge Book (Army Book 27)—cases treated in barracks.

Morning Sick Book (treatment)—manuscript Detained Book (treatment)—manuscript Ward Prescription Books (I.A.F. M. 1,227)	Copy of prescriptions of hospital stock mixtures should be kept at the back of these books for ready reference.

Sanitary Report Books of Units.
Hospital Order Book.

[1] Army Regulations, India. [2] Indian Army Form.
[3] Indian Army Orders.

Hospital Standing Order Book.
Hospital Diary.
Form E Book.
Cheque Book (manuscript record of all cheques received).
Library Books with their register.

(*C*) *Documents.*—Confidential documents with register, *vide* A.R.I., vol ii, para. 458-460.

Confidential reports, *vide* A.R.I., vol. ii, para. 170 and instruction No. 4 on I.A.F. I. 1,122 (Indian Subordinate Medical Department Annual Confidential Report) Documents of Army Hospital Corps (I.A.F. K. 1,156 and M. 1,242; in connexion with these *vide* Section VI Standing Orders for Military Medical Services in India). Medical case sheets (A.F. I. 1,237): these should go with cases in the wards.

Malaria case sheets.

Medical history sheets (A.F. B. 178) of units which should be arranged under four classifications, as follows: (*a*) Sheets of men who have been inoculated but have not had enteric fever; (*b*) sheets of men who have been inoculated but have had enteric fever; (*c*) sheets of men who have not been inoculated but have had enteric fever; (*d*) sheets of men who have never been inoculated and have never had enteric fever.

(*D*) *Correspondence.*—Under this heading are enumerated merely the names and form numbers of the chief books and forms employed in the receiving, registering, and dispatch of correspondence in the office.

Forwarding or Local Dispatch Book (I.A.F. Z. 2,024).

Letter Book, i.e., book containing copies of letters first issued from the office (I.A.F. Z. 2,066).

Register of Documents Book, i.e., book in which letters received are recorded (I.A.F. Z. 2,006).

The Number, Dispatch, and Postage Book, which is popularly known as the Stamp Book (I.A.F. Z. 2,007); this book should be signed daily and it is advisable that the balance of stamps on hand should be shown each day in red ink.

It is essential that the officer taking over charge should make himself familiar as rapidly as possible with the method in which correspondence is filed in the office, so that in the absence of the hospital writer, or Senior Assistant Surgeon, he may himself be able to turn up any correspondence to which he may have occasion to refer. Not infrequently it will be found that there is little or no method employed in the filing of correspondence, in which case it is probably arranged in one file in chronological order independent of subject matter.

(*E*) *Surgical Equipment.*—This comes under two headings, as follows:—

(*a*) Authorized articles of surgical equipment, of which a list is to be found in Section V of Army Tables Medical (India): all these articles are to be accounted for on Surgical Equipment Ledger, I.A.F. M. 1,224.

Articles which are deficient or unserviceable are to be accounted for on Loss Statements, I.A.F. A. 498. Expendible articles, if expended, are to be accounted for on Expense Vouchers, I.A.F. Z. 2,096.

(*b*) Unauthorized articles of surgical equipment; any article of surgical equipment enumerated in Section V of Army Tables Medical (India), which may be required for a particular hospital, and which is not authorized by these tables for that hospital, can only be obtained from the medical store depot with the sanction of the Director, Medical Services India, *vide* A.R.I., vol. vi, para. 127, as amended by I.A.O., Appendix 34, July, 1908, and Appendix 55, July, 1909. All such articles (unauthorized) of surgical equipment are to be accounted for also on Surgical Equipment Ledger, I.A.F. M. 1,224. There is another class of unauthorized articles of surgical equipment: e.g., if an instrument, not authorized by above tables for a particular hospital, is urgently required for immediate use in that hospital it may be purchased locally and paid for out of the hospital fund (*vide* H. b 1 below). It is advisable that all such instruments should be accounted for in a special manuscript book, and opposite the name of the instrument there should be statements showing the reason why it was purchased, date purchased, by whom purchased, firm from which purchased, price with receipt attached, and there should be a remark column in which an entry should be made by some responsible person as soon as the article becomes unserviceable.

(*F*) *Medicines.*—These also come under two headings, as follows:—

(*a*) Authorized medicines, a list of which is to be found in Section V of Army Tables Medical (India); these are to be shown in Expense Book, I.A.F. M. 1,227: see that the amount in stock in the medical store of the hospital tallies with the amount shown as being on hand in the Expense Book. All drugs should, of course, bear date of receipt.

(*b*) Unauthorized medicines. These are medicines which are not authorized by Section V of Army Tables Medical (India); they are medicines which are purchased locally and paid for out of the allotment for local purchase of medicines (*vide* I (*d*) below). These should also be shown in Expense Book, I.A.F. M. 1,227, and an entry made to the effect that they were purchased from the allotment for the local purchase of medicines.

(*G*) *Field Medical Equipment of Units.*—This is to be shown on surgical equipment ledger, I.A.F. M. 1,227; in connexion with this, *vide* A.R.I., vol. vi, para. 133.

(*H*) *Surgical and Medical Stores belonging to Field Ambulances.*—These are to be shown on Surgical Equipment Ledger also; in connexion with these *vide* A.R.I., vol. vi, para. 133.

(*I*) *Funds and Allotments.*—For regulations connected with these, *vide* A.R.I., vol. ii, para. 174, vol. iii, para. 170, and heading "Public Funds" in definitions of vol. iii. The following come under this heading:—

(*a*) *Army Hospital Corps Clothing Fund.*—This money is in charge of

the O.C. Station Hospital, and is usually kept in the Post Office, or in a bank. The entries are made in manuscript in a book showing receipts (each man getting two rupees eight annas per quarter) and expenditure: there is no special Army book for this purpose. It may be of interest to state that the writer of this article upon one occasion, when taking over charge of a hospital, found that the clothing money, which had been deposited in the Post Office, had accumulated quite a lot of interest; the question arose as to the method of disposing of this interest, and the idea was brought to the notice of the men themselves of utilizing the interest to help to defray the cost of freight for bringing clothes from the Army Clothing Department, and the men agreed to it. In the division of this interest for the above purpose the O.C. Station Hospital was the sole arbitrator as to the amount to be allotted towards defraying the cost of freight of each packet of clothing—the man's character and amount of money in hand being taken into consideration; the men of good character with least money were allotted most money.

(*b*) Library Fund, *vide* A.R.I., vol. ii, para. 619.

(*c*) Garden Fund, *vide* A.R.I., vol. vi, para. 97. In connexion with these two funds (*b*) and (*c*), an order was issued recently to the effect that: (1) The fund hitherto known as the Garden Fund will in future be called the Station Hospital Fund. (2) The O.C. Station Hospital will be responsible for the receipts and expenditure, and for the correct keeping of accounts which will invariably be filled in in his own handwriting, or in that of a commissioned medical officer. (3) The fund will be audited quarterly by a board consisting of at least two medical officers.

(*d*) Allotment for the local purchase of medicines. A certain amount of money is allotted to each hospital every year for the purpose of purchasing locally medicines that may be required, but which cannot be drawn from the medical store depot, as they are not authorized by Army Tables Medical (India), *vide* F b above.

(*e*) Allotments for office contingencies, *vide* A.R.I., vol. iii, under "Definitions."

(*f*) Allotment for the purchase of local supplies (hospital), *vide* Army Tables Medical (India), Section VI, Table XXXIV.

(*g*) Imprest money, *vide* para. A.R.I., vol. iii, para. 41.

(*J*) *Barrack Equipment Ledger* (I.A.F. W. 1,814).—In connexion with this *vide* A.R.I., vol. vi, para. 94-95.

(*K*) *Hospital Storekeeper's Godown.—Vide* A.R.I., vol. vi, para. 137-140. There are two books of importance in connexion with this godown, viz., I.A.F. S. 1,579 (daily balance of hospital, clothing, bedding, &c.), and S. 1,582 (fortnightly balance-sheet of hospital miscellaneous articles). In these books statements are given daily for some articles, e.g., bedding, &c., and fortnightly for other articles, e.g., cooking utensils, showing the number of articles actually in hospital (i.e., in charge of the O.C. Station Hospital, as this officer signs these statements), and the number in the

storekeeper's godown. It is recommended that care should be taken to check occasionally those articles which are shown as being in the hospital: this will be seen to be necessary in view of the fact that an officer commanding a hospital has been called upon to pay for articles which he signed for in the above books as being in hospital, but when called upon to produce them he was unable to do so; this was obviously due to the fact that the storekeeper made false entries in the above books and put them before the officer in question to sign, knowing that he would do so without checking them.

THE PREVENTION OF DENTAL CARIES.[1]

By Major W. K. STEELE.
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The question of the decay of teeth in the nation is so large a one, and the tackling of the question opens up such a vista of expense, that any practical suggestion to deal with the matter on the most economical lines may be welcome to those who have the interest of the nation and its public services at heart.

In the year 1909, 15,567 would-be recruits were rejected on medical examination for the Army. Of these, 2,760 were rejected for loss and decay of many teeth, and 86 had to be dispensed with within three months for similar reasons. I notice that 2,931 were rejected for being under chest measurement, and my experience tells me that that means malnutrition, probably largely due to defective teeth. Here, then, in the Army alone we have an enormous wastage due to teeth troubles. If the figures from the Navy and the Civil Services were available, I am persuaded that none would dare to say that the position is not alarming. In the past four years it has been found absolutely necessary to deal with the recruit's teeth immediately on enlistment, and to-day the Army dental bill is a gradually increasing one.

Now, what I want to point out is this: If the medical inspection of elementary school children is to be followed by a systematic method of dental attention, not only would the rejections for the services greatly diminish, but there is little doubt that the present Army dental expenditure would be very considerably reduced. Such results would abundantly justify an Imperial grant to help the County Council expenditure on dental treatment, which expenditure, if controlled by the right people and laid out on the right lines, need not necessarily assume the proportions we imagine at first sight. Such a grant the Imperial Exchequer is now prepared to make. That is to say, the Board of Education is now prepared to bear part of the cost of the dental treatment of children in elementary schools.

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[1] Reprinted from the *Wiltshire Gazette*.

My suggestion is that the school authorities should make themselves responsible for four teeth only in the schoolboy, viz., the first or 6-year-old lower molar and the second or 12-year-old lower molar. An examination of over 600 school children in Devizes some three years ago convinced me that while the molar teeth of the upper jaw were fairly sound, the molar teeth in the lower jaw commenced to go almost as soon as they were erupted. If each child was examined at the age of 7 or 8, the first lower molar could be saved permanently, probably with little trouble or cost. As a rule, it is beginning to go at this age; needless to say it has hopelessly gone when the lad is old enough to join one or another of the services. Again, if every boy were examined before leaving school with a view to saving his second lower molars, these could be saved permanently and at little cost. Of course, now and again an upper molar might have to be tackled, but if the principle were recognized that four teeth was the extreme number that could be conserved during the school age, no great expense would be incurred. Without a doubt, if this were done, the boys would live through the growing age with sound opposing molar teeth; and this fact alone must have a tremendous bearing on the future physique of the nation. To show how the selection of certain teeth is justified, I would call attention to the results of examining 115 candidates for the Special Reserve at the depot, Devizes. All the lads were between 17 and 18 years of age, and the dental standard for them is not so high as that required of recruits for the regular Army. Ten had, as far as I could judge, using a mirror and a probe, perfect teeth. Twelve had "good teeth," that is, the dental caries was not so advanced as to prevent conservation. In seventy-two the first and second lower molars were deficient or hopelessly decayed. In only twelve was there decay of the upper molar teeth, and in only nine were the teeth altogether bad. Here, then, is a distinct argument in favour of partial dental treatment to elementary school children at the public expense. A large number of the above would-be recruits were ultimately rejected for the Army, and I have no doubt could not be accepted by any service. If they had had dental treatment at an earlier age they would have become an asset instead of an incubus to the nation. I quite understand that "dental attention," as generally understood, would mean a vast expense, and might sometimes throw the school curriculum out of gear. But, to arrest decay in certain important teeth at an early age is quite feasible, and should not be expensive. A tooth beginning to go can be "stopped" in twenty minutes or half an hour; a year later it may be a two hours' job. In dentistry time is money. The result of this neglect of the teeth of the school children has been to present to the Army dentist many hopeless problems. As a rule he is a private practitioner working at contract rates; and sometimes in the past a deal of public money has been wasted. Surely it must be much cheaper, much easier, and much more satisfactory to arrest commencing caries in children of 7 to 13 than

to attempt to tackle a big dental problem at the age of 18 at high pressure and at contract rates. Such a scheme as I have tried to outline is only made possible by engaging the whole-time services of one or more dental surgeons for the school children. It is distinctly not one for the haphazard kindness of local care committees, who must often be hampered for want of money, and would be unable to find a private practitioner who would systematically do the work. They might even be driven to employing those who had no qualification for the work except that they cost little.

Now that the Education Department has received a grant from the Imperial Exchequer to be used to reimburse the local authorities in their expenditure in this matter of teeth, surely it is a short-sighted policy not to tackle this question in "an Imperial and patriotic spirit."

Vast numbers of youths are unable to enter the public services year by year because of dental caries and the attendant consequences. The law now says the County Councils are responsible for the hygiene and the health of the children. On the health of the children depends the very existence of England as a first-rate Power. Do the public realize these things?

Report.

XVIIth INTERNATIONAL CONGRESS OF MEDICINE, SECTION XX, NAVAL AND MILITARY MEDICINE.

By Major C. E. POLLOCK.
Royal Army Medical Corps.

This Section met at the Royal Army Medical College, under the Presidency of Sir Launcelotte Gubbins, Director-General, Army Medical Service.

The following note gives a brief *résumé* of the main features of the discussions in the Sections of Naval and Military Medicine.

The first meeting of the Section was held on Wednesday afternoon, August 6. The Director-General, A.M.S., President of the Section, opened the proceedings with a brief address of welcome to the delegates of foreign countries, in which he also drew attention to the fact that at the last Congress held in London the Section of Military Medicine and Surgery, as it was then called, was mainly occupied in discussing the application of antiseptics to wounds in war.

The Transport of Wounded in Hill Warfare.

This discussion was opened by Colonel Skinner, who read the paper presented by the D.M.S. India. This gave a historical review of the

various methods of transport used in the campaigns on the frontier of India. These are described in R.A.M.C. training. Dr. Nieuhaus, of the Swiss Army, then gave a description of the methods employed by the Swiss Mountain Medical Units. He strongly advocated the use of a stretcher supported on a sleigh with wooden runners; the sleigh can be guided and its pace regulated by ropes held by two men walking behind it. He also spoke well of a folding wheeled stretcher. Médecin-Major Eybert, of the French Army, presented a paper in which he advocated the transport of wounded on men's backs, and also spoke favourably of the use of "luges" on grassy or snowy slopes. He claimed many advantages for the stretcher which he has invented, the essential feature of which is that the canvas is attached to the end of the poles but not to the middle; it forms a kind of hammock in which the man can maintain a semi-reclining position, and in this way be carried on the back of a single bearer, or by attaching longer poles the stretcher can be used as a travois.

Hospital Ships and Transport of Wounded.

This subject was introduced by Surgeon-Inspector I. Nishi, Imperial Japanese Navy, who gave a minute description of the hospital ships used by the Japanese in the Russo-Japanese War. The arrangement of the ship and the equipment provided seemed to be as nearly perfect as it is possible to make them. He also showed a number of photographs of wards, &c., and of the Japanese bamboo screen stretcher for use on board ship.

Fleet-Surgeon McNabb, R.N., gave a short sketch of the requirements of a hospital ship, based on the experience gained while in charge of the British hospital ship "Maine."

Generale Medico Commendatore Calcagno spoke of the Italian hospital ships employed during the Tripolitan campaign; he showed a number of photographs bearing on the subject.

Water Supplies in the Field.

Surgeon-Major Dr. Zoltan v. Ajkay, Hungarian Army, gave an exhaustive summary of all the different means which have been employed for purifying drinking water on field service. He concluded by advocating the use of heat up to 105° C. as the only reliable means of ensuring a germ-free supply.

Lieutenant-Colonel E. Jennings, I.M.S., discussed the water supply of troops in the field mainly from the aspect of active service in tropical countries. He advocated the organization of a water supply corps specially trained for the purpose, and described the equipment it should have. He would allow two mules for each company, one to carry the filtering apparatus and one to carry 100 pints of filtered drinking water. He preferred a rapid filter, which will remove most of the germs, and

suggests one made of aluminium in which a filtering medium is used in addition to candles.

Colonel Horrocks pointed out that a temperature of 80° C. is sufficient for all practical purposes, and that for technical reasons heat sterilizing apparatus are only suitable for use in stationary posts. In the field clarification by rapid filtration, with, when possible, the addition of 1 in 1,000,000 parts of chlorine, is a more satisfactory method of purifying water.

Antityphoid Inoculation.

On Friday, August 8, a discussion on antityphoid inoculation was opened by Médecin-Principal Vincent, in charge of the antityphoid vaccine laboratory at the Val de Grâce Hospital, Paris. He uses a polyvalent strain of typhoid and sterilizes the culture by the addition of ether, which after twelve hours' contact is allowed to evaporate. He prefers to give five injections at intervals of a week. Some very striking results were obtained in Morocco and in the garrison of Avignon, where an epidemic of typhoid fever was cut short by the inoculation of all troops in garrison.

Major F. Russell, Medical Corps, U.S.A., presented a paper showing the results obtained in the U.S. Army. He pointed out that in 1898 sanitary precautions alone failed to prevent a very severe epidemic of enteric fever in the camps in the Southern States. Taking one of the 1898 camps he showed that among 10,759 men there were 1,729 cases of enteric fever and 248 deaths. In 1911, among twice the number of troops encamped under similar conditions, but who in addition were protected by inoculation, there were only two mild cases of typhoid fever.

Sir William Leishman then gave a brief review of antityphoid work in the British Army. After a short description of the preparation, technique of administration, and certain technical problems connected with the subject, he showed by curves the very great reduction which had taken place in the incidence and mortality from enteric fever among British troops in India since the adoption of antityphoid inoculation and other preventive measures. In 1912 there were only 118 cases with twenty-six deaths, as against 2,375 cases with 657 deaths in 1898; the admission ratio for 1912 was 1·7 per one thousand of strength, that for 1898 was 36·3.

Professor Rodet, of Montpellier, then spoke of his serum in the treatment of typhoid fever, and claimed that it had reduced the mortality from 7·4 per cent to 4·7 per cent in cases in which the treatment was begun before the ninth day of the disease.

Tenente-Generale Medico L. di Cavallerleone said that on the outbreak of the late war with Turkey he was convinced of the protection which antityphoid vaccination would confer on the troops, and attempted to have this carried out. Unfortunately the pressure of mobilization rendered this procedure impossible.

Professor Reynès, of Montpellier, said that in the south-east of France

the vaccine prepared by Ranque and Sénez was generally employed. This vaccine is standardized and then sterilized by the addition of a solution of iodine and iodide of potassium; after an exposure of half an hour the iodine is neutralized by the addition of hyposulphite of soda. He claims that the immunizing power of the vaccine is not interfered with and that the reaction is very mild; also that among 2,000 persons inoculated with this vaccine not one developed enteric fever, although a severe epidemic was present at the time.

Dr. W. Broughton Alcock, of the Pasteur Institute, Paris, called attention to Besredka's *vaccine sensibilisé* (living bacilli exposed for varying periods to immune serum). He quoted a number of cases in which this vaccine had been employed with satisfactory results.

Generale Medico Calcagno, Italian Navy, gave a brief account of the antityphoid inoculation employed for the naval forces landed at Tobruk. Two vaccines were employed, one prepared at the Serological Institute of Milan according to Wright's technique; this vaccine caused a marked local reaction and was objected to by the men. The other vaccine, a polyvalent one prepared by Professor Sclavo according to Shiga's formula, did not cause any definite reaction. No cases of enteric fever developed among the inoculated men.

Professor Netter concurred in the value of antityphoid vaccination and said that the particular form of vaccine employed appeared to be immaterial.

Sanitary Organization in the Tropics.

This discussion was opened by Sir Ronald Ross, who in a very able paper demanded the unification of all the departments which are concerned in sanitation, taking sanitation in its widest sense as covering every department concerned in the care of the public health. He pointed out that at present the medical and sanitary departments are generally independent of each other, or the sanitary branch is subordinated to the medical. Sanitary engineering, research and statistics, should also be controlled by the chief sanitary authority. The sanitary authority in tropical colonies is generally a board of laymen, ignorant of the subject and more interested in local politics and their own personal affairs than in looking after the public health. Financial means are rarely sufficient to carry out the work properly. The head of the sanitary department should be represented on the supreme governing body of the colony.

Stabsarzt Dr. Hintze gave a sketch of the existing medical and sanitary organization of the German colonies.

Colonel P. Hehir, I.M.S., gave a summary of the sanitary organization of the Army in India, and said that the instruction of the officers and men in the principles of hygiene had exercised a most beneficial effect on the health of the Army.

Professor Wasilewsky spoke of the use of rabbits for maintaining a virulent strain of vaccine lymph in the Tropics.

Professor Agramonte said that in Cuba all the reforms advocated by Ross had already been introduced.

Dr. E. Black said that the Public Health Service of Western Australia embodied the best features to be found in the British, French and German colonies. The principle adopted was to place all matters which concerned the population as a whole under the Central Government, and to allow local bodies to manage their own affairs.

Dr. Sandwith said that in Egypt most of Ross's reforms had been adopted already. He laid stress on the fact that in Oriental countries the success of sanitation lay with the village authorities and not with the governing body.

Dr. Harford, of Livingstone College, spoke of the good work done by missionaries as pioneers of sanitation among the native population. He referred to the danger of alcoholizing the natives of West Africa.

Dr. Olpp, of Tübingen, agreed with the preceding remarks.

Dr. Anderson said that all officials in the Colonial Civil Service, but especially the Governor, should have some elementary knowledge of the diseases prevalent in the country, and that only picked men should be appointed to any position in the sanitary service.

Dr. Andrew Balfour (Khartoum) said that the sanitary inspectors in colonies should be trained in tropical hygiene; the Sudan Government had recognized the value of such a training by giving higher pay to those so qualified.

The Treatment of Syphilis with Salvarsan and Allied Substances.

This important subject was discussed in conjunction with Section XIII, the meeting being held at St. Thomas's Hospital under the joint Chairmanship of Surgeon-General Sir Launcelotte Gubbins and Sir Malcolm Morris, Presidents of the XXth and XIIIth Sections respectively; it was very largely attended.

The discussion was opened by WGR Professor Ehrlich, who described briefly the composition of salvarsan, and said that it acted by anchoring the toxins of the spirochætes. He then proceeded to enumerate a number of experiments on animals undertaken to determine the safe maximum dose of the drug for man. He stated that salvarsan has no affinity for the nervous tissues, and is not found in the brain in cases which have died after the administration of the drug. He maintained that the febrile reaction which so often followed the intravenous injection of salvarsan was caused by the rapid lysis of large numbers of spirochætes; when intramuscular injection is employed the salvarsan is more slowly absorbed, hence the spirochætes are only destroyed

gradually and do not cause any marked reaction. Ehrlich says that idiosyncrasy to salvarsan is very rare, but he recommends that the administration should be begun with a small trial dose of, say, 0·1 grm., followed after a few days by a slightly larger dose of about 0·3 grm.; in this way it should be possible to detect any idiosyncrasy before injecting a dangerously large dose and also to minimize the severity of reactions. Salvarsan must not be given to persons suffering from nephritis, Addison's disease, arterio-sclerosis, or the status lymphaticus. Ehrlich also paid a generous tribute to the excellent work done at Rochester Row Hospital, which he said had not only been of the greatest help to himself but had also rendered world-wide service to the therapy of salvarsan.

The report by Lieutenant-Colonel Gibbard and Major Harrison was next read. They stated that as the result of three years' experience spent in careful trials and observations they had adopted the following treatment of syphilis. As soon as a diagnosis is made they give one injection of 0·6 grm. salvarsan and then nine weekly injections, each containing 1 gr. of mercury, and finally a second injection of 0·6 grm. of salvarsan. This plan has not only given better results than any other they have tried, but it appears to hold out a reasonable prospect of curing the disease, for in 100 cases treated in this way and kept under constant observation for the following twelve months, there were only 5 per cent of clinical relapses and 18 per cent of Wassermann relapses. When treatment was begun in the primary stage there were only 11·4 per cent of total relapses; when treatment was not begun until the secondary stage had set in the percentage of relapses was 33·8.

These officers have given over 3,000 injections of salvarsan without the occurrence of any serious complication or fatality. Idiosyncrasy to the drug must be extremely rare, but its administration should only be entrusted to persons thoroughly acquainted with its technique and risks.

Professor Wassermann said that he spoke not as an expert on the treatment of syphilis but merely as a serologist. Before the introduction of salvarsan almost all the serums sent to his laboratory to be tested, after the completion of treatment, gave a positive reaction; the serum of patients treated with salvarsan mostly gave a negative reaction. In cases in which the treatment is begun soon after the infection takes place the reaction can be converted from positive to negative fairly easily; in neglected cases of some duration the positive reaction tends to persist most obstinately in spite of energetic treatment. The fate of every syphilitic is decided within the first two years following the infection; neglect of treatment during this period cannot be made good afterwards. The reaction of the cerebrospinal fluid is quite independent of that given by the blood serum. A positive reaction in the cerebrospinal fluid indicates that the central nervous system is being attacked. In addition to having his blood serum tested, the cerebrospinal fluid of every syphilitic should

be tested at the end of the first year when treatment has been completed.

Seventeen other distinguished syphilologists took part in the discussion, and although certain reservations were made, in the main they favoured the employment of salvarsan in the treatment of syphilis.

Caisson Disease.

Staff-Surgeon Stewart read a paper in which he discussed the physiology of diving. Recent experiments and observations have demonstrated the fact that when divers suffer from discomfort while working at great depths, the distress is not due to the pressure but to the excess of carbonic acid gas in the air they are breathing; to prevent this occurring the man must be supplied with the same *volume* of air while at work below water as he requires when on the surface, that is with not less than 1·5 cubic foot per minute.

Caisson disease itself is caused by a too rapid ascent, the sudden diminution of pressure leading to the formation of bubbles of gas in the blood-vessels. The only effective treatment is rapid recompression either by immediately sending the man down again or by the use of a compression chamber. Tables showing the time limits for work at various depths and the rate of ascent have been prepared by the Admiralty for the guidance of those in charge of diving operations.

The Physiology of Physical Training and Marching.

Captain G. A. D. Harvey read a very good paper on this subject embodying the results of a number of experiments and observations carried out to investigate the physiology of marching. He pointed out that the human body resembles an internal combustion machine in that when at work it generates heat. Provided this does not lead to a rise in the body temperature of more than 2·2° F., it is beneficial, but beyond this it rapidly becomes serious, and if a temperature of 103° F. is maintained for any length of time symptoms resembling those of heat-stroke begin to make their appearance.

The body temperature is regulated by the production and dissipation of heat. The production of heat is increased by increased work, which in turn is caused by accelerating the pace of marching, by carrying a load, especially if badly balanced, and by any physical discomfort which prevents a man from working at his economical rate. The dissipation of heat is mainly due to evaporation, and this is favoured by a cool, dry atmosphere, especially by one in motion, and by wearing light loose clothing with an absence of any constricting straps. In order to permit evaporation to take place a free supply of water is absolutely necessary.

Major Jarvis, United States Army, said that in well-trained soldiers marching became an automatic action which did not make any call on the man's voluntary effort.

Surgeon-General W. May, Director-General of the Naval Medical Service, quoted his experiences when marching across the desert to the relief of Khartoum; he said that although all the conditions were most unfavourable each man was only allowed three tumblerfuls of water a day, and yet no one suffered any injury from the want of it.

Marine Oberstabsarzt Buchinger presented a paper in which he gave an exhaustive review of the physiology of physical training. He maintained that every man ought to be either a sportsman, gymnast, or a soldier. Whichever he elected to be, he must endeavour to cultivate his physical development. Buchinger strongly recommends a vegetarian diet and total abstinence from alcohol.

INDEPENDENT PAPERS.

Stabsarzt Dr. Georg Mayer presented a paper on epidemic food poisoning, in which he classified all the epidemics reported in Europe, during the last forty years, according to the causative agents, i.e., chemical poisons, bacteria and their toxins, and trichinæ. At the end of the paper a summary of all epidemics was shown on the screen in tabular form. At the present time the commonest form of epidemic food poisoning is that caused by eating unwholesome meat. In some instances the animal has been suffering from disease at the time it was slaughtered, but in the majority of epidemics the meat has been contaminated by the *B. paratyphosus*, *B. enteritidis* (Gaertner), or *B. proteus vulgaris*, subsequent to the animal being slaughtered. The paper is worth studying in detail by those interested in food supplies.

The same officer described a rapid means of disinfecting clothing and equipment by the use of steam and formaldehyde vapour in a so-called vacuum chamber. The pressure is reduced to 0·2 of an atmosphere by means of an air pump, which also keeps the temperature down to 45° C. Spores are killed in a quarter of an hour without damage to any material.

Marine Oberstabsarzt Dr. Staby discussed the medical arrangements of landing parties and pointed out how these differed from similar expeditions carried out by detachments from land forces.

The Director of Medical Services, India, presented two papers; one dealt with medical organization in the field and the other with the training of medical personnel for field service.

Captain Chambers, I.M.S., presented a note on prophylactic inoculation against enteric fever amongst Indians, in which he advocated the extension of this form of protection to the Indian Army.

Staff-Surgeon Hirano presented a paper on the sanitation of the Japanese Navy in the wars of 1895 and of 1904-5.

Tenente-Generale Medico L. di Cavallerleone read a paper on a portable "X" ray apparatus which he had invented for use in the field.

Echoes of the Past.

NOTES ON THE SURGICAL BASE HOSPITAL AT GOZO AND OF THE GENERAL HOSPITAL AT ALEXANDRIA, 1882-3.

By Colonel J. M. BEAMISH.
Retired Pay.

Some particulars of the Surgical Base Hospital established at Gozo, during the active period of the Egyptian Campaign of 1882 up to, and even after, its sudden dénouement at Tel-el-Kebir on September 13, as well as of the General Hospital at Alexandria, seem worth recording even now, under the peculiar circumstances of their brief existence.

The idea of Base Hospitals, surgical and medical, at Gozo and Cyprus respectively was entertained as early as July, and, as regards the former, it may be stated that some of the medical staff detailed for the proposed hospital at Gozo, the writer among the number, sailed from Southampton in the twin-screw s.s. "Tower Hill" on August 4, arriving at Malta 13th idem.

The late Surgeon-Major-General Tippetts (then Brigade Surgeon) was in charge with the late Surgeon-Major Fitzgerald Second in Command, two surgeons, including the writer, both now retired in higher rank, and an apothecary, all of whom were busily engaged at Malta putting together equipment for 100 beds. By the 23rd the Commissariat Staff under a serjeant with stores, &c., and four nursing sisters were also ready; they all joined at Fort Chambrai, Gozo, where a large square casemated building, or barrack, of the era of the Knights of St. John, surrounded by a dry moat crossed at the main gate by a drawbridge, was adapted for occupation as a hospital. The same idea of utilizing this building as a hospital came up in Crimean days, but did not then materialize.

The medical officers, five in number including the apothecary, then so designated, and a subaltern of the Durham L.I. commanding a detachment for guard, &c., were located in the quondam Governor's house close by, which had long been unoccupied since the abolition of the appointment, and was very fairly adapted for its new purpose of a small mess and officers' quarters.

The buildings referred to were situated on high ground, a spur of a hill or promontory overlooking, within short distance, a creek

which admitted of landing from small boats, and farther out to sea afforded anchorage for larger craft, even the old Indian troopships, two of which put in at different times in September with wounded from the seat of war.

The *raison d'être* of the Gozo Hospital having ceased with early British successes and collapse of Arabi's army at Tel-el-Kebir, no more than two batches of wounded, making less than 100, arrived at Gozo, others having for the most part been dispatched from Egypt to Netley and elsewhere direct.

The rôle of the medical staff at Gozo was thenceforth limited to the care and surgical treatment of the wounded they had received during September, which occupied the interval up to November 10, when on their convalescence and final disposal, the hospital was demobilized, and the medical officers, nursing sisters, and stores dispatched to Egypt, there to take part in the aftermath of the war at the large base and general hospitals near Cairo (Abbasseyeh) and Alexandria (Gabari).

The building at Fort Chambrai serving as a hospital, in outline more or less a square, was disposed in a number of parallel sections (wards) with intervening arches, well protected by thick walls and casemated roof from external heat during the autumn months. Ventilation was defective, sand-flies were also troublesome and more difficult to guard against than mosquitoes.

The admissions, all surgical, included a wide range of injuries to the head, chest, and extremities. Two cases of compound fracture of the forearm and leg, with severe complicating lesions, suffered amputation, and made good recoveries. A case of penetrating wound of chest—complete, with apertures of entry and exit—recovered without a bad symptom. Expectant treatment succeeded admirably in two cases of compound fracture of the thigh. One in the middle third made a perfect recovery with little or no shortening. Another, more serious, of the upper third, complicated with severe hæmorrhage, requiring check by relays of assistants in the early period, and subsequent removal of spiculæ of bone by operation, also made a good recovery with shortening of two inches and a most useful limb.

Carbolic acid solution of varying strengths was the most general antiseptic used, and in spite of a close atmosphere kept wounds sweet and clean.

A most noteworthy case was an apparently slight wound of scalp tunnelled to the extent of a couple of inches, with some roughness of the outer table of the skull, but no displacement

externally. The man had no serious symptoms for the first week, and even later walked about as he seemed convalescent. About this period headache with increasing delirium, which became violent with explosive symptoms, came on and was followed by collapse and death.

The external wound had almost healed, but at an autopsy slight roughening of the external table, as at first diagnosed, was evident. There was, however, a starred fracture of the inner table with spiculæ of bone resting on the brain.

The case was doubtless one for trephining, as the event proved, had there been earlier symptoms and especially depression, but neither was present. In the substance of the brain itself was found a diffused abscess, hour-glass in shape, deeply seated in the vertical axis. (See also a similar case which did well in the officers' hospital at Mandalay).

A trooper of the Life Guards—said to have cleft an Egyptian in twain—suffered from wrist-drop through severance of tendons, and made but a partial recovery, up to the time of leaving Gozo.

On arrival at Alexandria, November 23, the personnel of the Gozo Hospital were dispersed and the writer posted as adjutant and secretary to the General Hospital (400 beds) at Gabari, a western suburb of Alexandria. Here the hospital was improvised from a large cotton store, comprising two wings—main wards—with ample wall space and upper ventilators, separated by a central space which was screened off by partitions to form a reception ward and offices, all suiting their temporary purpose admirably.

Convoys of sick arrived almost daily from Cairo for further disposal to England by transports anchored in the harbour at a convenient distance from the hospital, or detained at Gabari for further treatment.

Of the latter class there was always a large number, the worst, cases of dysentery and enteric fever ; in many instances both diseases combined in the same subject, furnishing numerous deaths within a short period, revealing post-mortem lesions typical of these diseases in both large and small intestines to an extent which the writer never witnessed before or since, and resembling the highly-coloured plates of text-books.

There were 150 men of the old Army Hospital Corps attached to the hospital wearing its distinctive uniform, but quite two-thirds of the number were only recently enrolled from various army units, to complete the cadre.

The late Surgeon-General Manley, V.C., was P.M.O., Brigade

Surgeons Lofthouse and T. B. Giraud were successively in charge of Gabari Hospital. About twenty-four of the Army Medical Staff were included in the garrison at this time and responded to civilities from the Alexandria Club by presenting a handsome clock. Baccarat was the ruling club game.

A lady of the Greek community made Christmas memorable by the unique and valuable gift of fifty turkeys to the patients in hospital.

As the writer was about to leave for England in relief early in March '83, it was in contemplation to move the Gabari Hospital to the vicinity of the disused Khedivial Palace at Ramleh—a building partly ruinous, and in the supposed habitable apartments quarters were assigned to medical officers in lieu of lodging allowance.

Sabotage, the work of Arabs, in the Grand Square, as well as damage to the principal hotel—Abbas—rendering it unfit for occupation, made accommodation scarce and expensive in Alexandria; but within a short time a new hotel was opened under French management—the Khedivial, late German Embassy—with an attractive garden; and here the greater number of unattached, including medical, officers were temporarily lodged during the months immediately following our occupation.

MEMORANDA OF THE 4TH BRITISH FIELD HOSPITAL IN THE 3RD BURMESE WAR, 1885-6.

By Colonel J. M. BEAMISH.
Retired Pay.

The annexation of Upper Burma, which was foreshadowed many years before the actual event, was undertaken in consequence of disputes with King Thebaw's Government relating to concessions to foreigners, touching especially the ruby mines, and other diplomatic contrarieties, ending in the dispatch of an expeditionary force under the late General Sir Harry Prendergast,[1] V.C., composed of British and Indian troops estimated in number at 10,000.

The base was of course Rangoon, and there were concentrated the various units with complement of medical officers, followers, &c., detailed to proceed with each, and join the field hospitals, British and native, attached to the force.

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[1] Died July, 1913.

The latter were dispatched in a somewhat leisurely manner as soon as they could be equipped at Rangoon, No. 4 B.F.H. being the writer's unit, with Surgeon-Major Townsend (now Surgeon-General Sir E. Townsend, K.C.B.) in command and three surgeons besides the writer, then Surgeon-Major and Second in Command, detailed from Fort Gwalior in Upper India.

Leaving Rangoon about November 15, in the Irrawaddy Flotilla Co. steamer, also named "Rangoon," given up to accommodation of mess, officers and administration, and carrying two "flats" on either side for sick, stores, &c., No. 4 B.F.H. passed Prome and Thayetmyo (then frontier station) on November 16, and, reaching Minhla, a little higher up the river, about 3 p.m. on the following day, found that three native regiments had been engaged with Burmese for several hours. An officer and several men had been killed and other officers, with a greater number of men, severely wounded. No British troops being actively engaged, though a few of the Liverpool Regiment were at some distance on the opposite bank, the medical officers of both the British and Indian Services were at once employed in the search for wounded, and in bringing in those who could be found alive, even with the aid of lanterns, after dark, to the field hospitals, in which all the medical officers were busily engaged, during a great part of the night, in the treatment of numerous injuries, many of them requiring major operations.

The battle-ground was a palm grove shading a group of pagodas on the river bank, necessitating irregular warfare and "sniping" from behind cover.

Five officers were seriously injured: One wound over tibia near ankle-joint, one sword-cut separating one side of scalp from calvarium down to the ear, but without penetrating, and only slightly injuring the outer table—one inguinal wound, perforating, with aperture of exit through buttock, and two others of less serious import. All these were at once taken in hand and placed in comparative comfort for the remainder of the night—all eventually doing well. Desultory firing from the Burmese continued during the whole night at Minhla, and an escorting boat was burnt to the water's edge close to No. 4 F.H., where also some dead natives shared the same fate at the river margin.

The field hospitals proceeded with the advancing troops in daylight the next day, Surgeon-Major McKenna, I.M.S., taking some wounded Burmese with him in the native field hospital all the way to Mandalay, where they became the nucleus of a civil hospital later. On the 22nd they reached Pagahn—one of several

abandoned Burmese cities with some striking pagodas—near which two sunken steamers were observed on the bank, sides uppermost. Myingyan was reached on the 25th, Ava on the 27th and Mandalay on November 28, 700 miles, and fourteen days, from Rangoon, or 50 miles per day.

There was practically no opposition after Minhla, though all preparations were made for an obstinate resistance below Ava, at a narrow part of the river, as ascertained afterwards by an inspection of masked batteries at the spot. But wiser counsels prevailed with the Burmese, who surrendered a great number of Remington rifles, and permitted our troops to enter the capital without molestation.

The King's palace within the Fort was secured at once, and Thebaw himself arrested, and deported, with his retinue, next evening, 29th, by steamer to his destination on the West Coast of India.

On the river expedition field guns of varying calibre mounted on barges and protected by metallic screens preceded, the troops being escorted by the flotilla steamers (the latter also armed), but there were no casualties after Minhla, till dacoity commenced, early in the following year.

The course being now clear both within and immediately round Mandalay Fort, the remaining field hospitals, which were meanwhile arriving by stages, were allocated to their several posts, No. 4 British Field Hospital, and 13 and 14 Native Field Hospitals—the last a cholera hospital, but fortunately not much required—in kyoungs at the base of Mandalay Hill, about three-quarters of a mile from the east gate of the Fort, with an extemporized officers' hospital and medical officers' mess in two smaller wooden buildings with open verandas close by, which, with some adaptation, were made fairly comfortable. Our immediate neighbours were battalions of the Royal Welsh Fusiliers and Hampshire Regiment. The 9th Mountain Battery had also disembarked at Mandalay Shore.

No. 5 B.F.H. soon arrived, and was located in the Fort itself, Surgeon-Major (late Colonel) Corbett in charge. And here the Fort may be described briefly as a modern walled enclosure of brick, a mile square, planned by an Italian engineer in the last century, surrounded by a wide moat filled with water (wet ditch), and approached by four main gates entered from bridges at opposite external centres of the square. The King's palace and a number of subsidiary buildings, all of wood, stood within the square, in which

fires were frequent during our early occupation and in fact ancillary to subsequent improvements, sanitary and other, which it was immediately necessary to undertake.

Work was soon in full swing at all the hospitals, malarial fever contributing a good quota of sick, in addition to which were many wounded from outposts—which were soon set going to combat dacoity—notably to No. 4 B.F.H. from Shwebo, north of Mandalay, where an engagement took place, resulting in some officers and a number of British soldiers being severely wounded. On the same occasion also a colonel of the Madras Staff Corps received a severe perforating wound of the face and neck, implicating the facial artery or its branches, whereby he lost much blood before the wound could be staunched on the field, and who with two other officers, R.E. and R.W.F., wounded respectively in the leg and knee-joint in an affair with dacoits elsewhere, became the writer's patients in the officers' hospital at Mandalay Hill.

On January 8 the writer was detailed in his turn to proceed to Sagaing, a post on the river twenty miles below Mandalay, to bring a party of sick to No. 4 B.F.H. The post lay about a quarter of a mile lower down the river than the landing stage of the steam launch, and was in charge of the late Surgeon Heath, A.M.S., who walked with the writer both ways between steamer and post and *vice versa*, in the transfer of patients. Next morning news came by wire to No 4 B.F.H., from which Surgeon Heath was detached, that the three officers on duty at the post were ambuscaded by some persons concealed in a thicket near the beach on the route described. Surgeon Heath was killed outright by chest and other wounds, gunshot and sabre, and a subaltern of the Hampshire Regiment, in the issue fatally wounded, escorted with difficulty to the launch by the third officer (Captain R.A.), himself by a miraculous chance unwounded.

The wounded Hampshire officer in his turn became the writer's patient also, and survived in the Mandalay officers' hospital for three weeks, 9th to 30th January. He had a complication of injuries—shattered face with fracture of lower jaw, loss of teeth on one side and secondary hæmorrhage from the mouth—all of which severe symptoms were issuing favourably in the third week, when an apparently less severe complication recrudesced, viz., a lodged bullet perforating the ilium, but without urgent symptoms till late in the third week, 29th, when hæmorrhage set in *per anum*, ending next day, 30th, in sudden collapse and death.

The autopsy was most interesting and instructive. The descending

colon and surrounding soft parts were gangrenous, hence the hæmorrhage, but where was the bullet? The whole abdomen and even the thorax were thoroughly explored, but in vain, till one of our colleagues made a casual incision into one of the inter-vertebral lumbar spaces (disc), about which there appeared to be some inflammatory thickening, completely concealing the site of the bullet which, moreover, lay embedded in the bony structure of the vertebræ. The riddle was solved, the pathological specimen was preserved and forwarded with details of the case to Sir T. Longmore, who courteously acknowledged its receipt.

The Staff Corps colonel referred to, a most sensitive and constitutionally feeble man, had slugs removed from the posterior aperture in the neck at the field hospital, and one eventually gravitated by the cellular space into the lower part of the neck, whence it was extracted later.[1]

The above cases, though comparatively few, implied as a rule protracted treatment and dressings before they could be removed in safety to the base.

Yet another Sagaing incident *vide supra*. A Staff Corps subaltern commanding a party of Native Infantry—eighty men, including a havildar and also another junior subaltern of the Hampshire Regiment—was ordered to proceed from this post (on the river) some distance into the interior, on reconnaissance duty. When near a pagoda the party, proceeding it is supposed somewhat incautiously, was fired upon, with the result that the senior subaltern received a fatal wound of the abdomen; while the surviving officer, aided by the havildar, was endeavouring to rescue his fallen comrade, he too was hit twice, one missile (bullet or slug)—the latter were common—passing through his helmet, grazing the skull, and lodging a bit of cork in the wound, and a second, doubtless also aimed at the abdomen, becoming deflected into his pouch, where it was found with his own cartridges. The officer recovered without complica-

[1] In another case, Surgeon-Major Townsend was assisted by the writer in the extraction (by external incision) of a round bullet lodged in the deep-seated tissues of the neck near carotid, &c. The man had been wounded some time before in the mesial line below the thyroid, and treated in another hospital, the external bullet wound having in the meantime healed and cicatrized. A feeling of discomfort with strong presumption of lodgment, however, persisting, the bullet was safely removed under circumstances requiring great care and delicate manipulation after the first incision. The later symptoms after healing of the original bullet wound were treated before admission to No. 4 B.F.H.—with iodine!

tions, the foreign body being removed in the first instance, and is now, one is glad to record, a D.S.O. of long standing, commanding a Native Regiment in the Punjab.

Cholera occurred among the British (and Native) troops in an intermittent form during the months of December and January, 1885-6. The cause was obscure, as precautions were taken, but doubtless opportunities for contracting the disease were not lacking in a newly-occupied large Native city. It was noticed that, as regards British troops, mental depression was largely associated with a fatal result. The men were treated in a large double-fly tent, and the weather was fairly cool and pleasant. The disease at no time took the form of a severe epidemic.

The late Surgeon-General Donnelly of the Madras Service was P.M.O. of the expedition, assisted by the late Surgeon-Lieutenant-Colonel W. A. Mackinnon, A.M.S., and Surgeon-General (then Surgeon-Major) Sibthorpe, I.M.S., afterwards of the Head-quarters Staff, as organizing officer at Rangoon, where, in the short space of a few months from the opening of the campaign, a splendid new General Hospital had arisen, as a permanent institution, constructed of teak, the building material of the country, but also serving the purposes of a base hospital to the field force.

Kahars to the number of 1,000 were drafted from the Punjab under the command and able direction of an R.E. officer.

Late in February, 1886, No. 4 B.F.H. was demobilized, upon which the writer was directed to proceed down river with a large convoy of sick and wounded, among them some of his own surgical patients, en route to Rangoon, and thence to India.

Officers' Hospital.—It may be premised, with reference to remarks above on location of field hospitals, that almost every Burmese house outside the native bazaar, in an open space, is adaptable for occupation by Europeans in Burma, being constructed on a roomy though open plan, of excellent wood (teak) and fairly clean. So it was with our subsidiary buildings—mess and officers' temporary hospital.

Nevertheless, much was to be desired in improving the lot of the less fortunate wounded officers, in the way of more appetizing food, rather than that supplied under field exigencies from a camp kitchen in the Tropics.

It so happened that at a distance of a mile or more eastward of Mandalay Hill, at the foot of which we were encamped, there was an unrivalled snipe ground, up to that time apparently untouched by a sportsman, from which a couple of our number

provided with guns sometimes obtained a bag of game of the best quality, which we were enabled, and took good care, to share with our suffering brother officers, and which it may be supposed they much appreciated.

This ground was supposed to be the abandoned bed, in whole or in part, of the mighty Irrawaddy longing for a change in a not very remote geological period, when the river presumably flowed eastward of the New Fort, instead of in full stream a mile westward as at present.

Our camp surroundings were decidedly picturesque, and calculated to stir the imagination: within a mile or so of the hospital buildings (kyoungs) southward stood (*a*) the "Incomparable Pagoda"—a square structure, impressive chiefly from its vast size, rising, tier upon tier, pyramid like, to a great height; (*b*) the "Queen's Kyoung"; and (*c*) the "Snake Kyoung," both of the latter most ornate, of exquisite carved gilt design, and the third (as known to the writer from the *Geological Journal* of October, 1908) recently reinforced as to its roof with concrete "to replace the original carved roof decayed."

All these stood out in undimmed majesty and splendour southward, while northward rose Mandalay Hill, clothed with forest, through which access was obtained by a footpath to a small, but neat, white, shining pagoda crowning the hill, the whole group constituting an enclave comparable with our cathedral sanctuaries and their residential quarters in this country. The dean's close and minor canons' dwellings were here represented imaginatively as they exist in the remote West—thus bringing humanity in design and execution to a common focus at the very extremes of longitude.

Nor were the university and school of theology unrepresented, for within a short distance of our camp was found a small building sheltering a number of large teak chests, each containing "bos," i.e., books bound in the native fashion—oblong in shape with gilt edges and outer covers of painted red-and-gilt wood secured externally by ornamental tape, and with contents kept in position by bamboo pegs. Each volume contained a number of sheets of thin lacquered material, on which the characters—it is supposed in Pali and modern Burmese—were stamped in gilt over a black ground—very handsome and effective in appearance, the Burmese having made the gilding art their own, unequalled probably elsewhere for skill and durability. These lacquered sheets might be compared to Sibylline leaves, or even papyri, the East here also,

even if more ancient, approximating to the very respectable antiquity of ancient Rome.

It is in fact surmised that Burmese architecture may be derived from Mesopotamia, and if so, the incomparable pagoda may be but a reflection of Babylon, and in very truth the vestibule of the Queen's Kyoung might claim not too remote kinship with Assyrian portals in the British Museum.

The Burmese sanctuary was, however, deserted, with a minimum of desecration, consequent on the flight of the occupants from war's alarms. It should be stated, however, that the G.O.C. took every precaution to preserve the ancient monuments, though some depredations were probably inevitable.

The Phoongies—teaching monks—left without an income to support their institutions on the deportation of their king, were in very real distress, and might be seen immediately after the occupation of Mandalay offering their Buddhas and other small relics for sale at contracted prices.

A pagoda and precincts near Mandalay Hill, bearing a near resemblance to a European cemetery, in a number of cone-shaped monuments (like pawns on a chess-board) thickly grouped together over a large area, and secured by a substantial containing wall—the whole washed white—completed the parallel, without exact reproduction, between the East and the West.

Such were some incidents of our first occupation of Mandalay, which we review across the vista of years with pleasing memory and ever increasing interest with the lapse of time.

The late Lieutenant-Colonel (then Surgeon-Major) McKenna, I.M.S. (Bengal), who died at Biarritz within recent years, was the S.M.O. of the Field Hospital Camp, and with all the members of the little mess, numbering about twelve—though not all actually present at the same time — some of whom still happily survive, contributed to make our *confrérie* one of the happiest that can be imagined.

We were visited at our camp by the distinguished correspondent of the *Illustrated London News*, the late Mr. Melton Prior, who by his genial manner and bright intellect earned for himself respect and approbation wherever he went.

Remarks.—Under Gozo notes will be found recorded a case of gunshot wound of the head (scalp), complicated, as evidenced post-mortem, with starred fracture of the inner table of the skull and brain abscess with a fatal result; with which may be compared the case of the Hampshire officer in memoranda of the Burmese War,

who received a very similar wound of the scalp (*vide supra*) with grazing of external table and lodgment of foreign body.

In neither case were there at first any urgent symptoms, and the Burmese case convalesced favourably from first to last, yet in the latter trephining was quite out of place, while in the Gozo case it might have given the patient at least a better chance. The different result may, I think, be explained by the varying force of impact from initial velocity in different rifles—Martini v. Remington—one possibly causing a brisk, sharp impact on the more resistant outer table, and producing fracture by *contre-coup* of the inner, which the other failed to effect.

Reviews.

THE DIAGNOSIS OF BACTERIA AND BLOOD PARASITES. By E. P. Minett, M.D., &c. Pp. 80, 8vo. Price 2s. 6d. net. Baillière, Tindall and Cox. 1913.

The preface dedicates this book to "students and members of the medical profession who desire a working knowledge only of a subject which is rapidly becoming of increasing importance," but we imagine that it makes its appeal chiefly to the victims of examinations. We have no doubt but that it cost the ingenious inventors of Bovril both time and trouble to reduce a whole ox to the dimensions of a single cup, and we feel that Dr. Minett has succeeded admirably in a somewhat similar and equally difficult task. The book shows evidence of great care in its preparation, and, on the whole, it gives, so far as it goes, an accurate and reliable account of the ordinary technique of laboratory work. What we are inclined to cavil at is not so much this book in particular, as the type of literature that it represents. The serious worker has no use for such a condensed account of his subject, and we believe that the candidate for examination would do well to make his own summary from some larger text-book. Although, as we have said, the arrangement and preparation of the little work are satisfactory, there are some inaccuracies that will require attention in the third edition. "Pearly white colonies" does not seem to us exactly to hit off the appearance of a culture of *Micrococcus melitensis*, and we think that the fact that this organism is a Gram-negative coccus hardly justifies its being grouped with the gonococcus, meningococcus, and *M. catarrhalis*.

The table of cultural reactions of the typho-colon group on p. 19 omits to indicate that the paratyphoid bacilli form gas in dextrose, maltose, mannite, &c., and we notice that the fermentation of dulcite by *Bacillus paratyphosus* B is shown as doubtful, while the typhoid bacillus is stated not to ferment it. In applying Wright's method of counting a bacterial emulsion the author hints that he bases his counts on the

contents of ten fields. At least a hundred fields should be counted. The method of obtaining preparations from a chancre for the demonstration of *Spirochæta pallida* is open to criticism.

S. L. C.

Manual of Surgical Treatment. London: Longmans, Green and Co. 1913, vol. iv. Pp. xxvii and 622. Price 21s. net.

The fourth volume of Cheyne and Burghard's "Manual of Surgical Treatment" has now been published. The previous volumes have led us to expect a high standard of excellence in the production of this series, and in the volume now before us this high standard has been worthily maintained.

Volume IV deals with affections of the jaws, tongue and alimentary canal. The diagnosis and treatment of malignant disease of the tongue are clearly and authoritatively discussed, and the appropriate operations for the eradication of this disease are well described. Chapters on affections of the pharynx and œsophagus follow, in which full mention is made of the method of intubation and the use of the œsophagoscope.

The surgical affections of the stomach and intestines are dealt with in twenty chapters, arranged so logically and written so lucidly that a rare pleasure is experienced in their perusal.

The volume closes with a description of the diseases incident to the rectum and anus.

The illustrations, some 600 in number, are well finished and explanatory. In effect, this volume is a masterpiece of good arrangement, clear English and modern surgery.

J. W. N. H.

The Mineral Waters of Vichy. By Charles Cotar. London: H. K. Lewis. 1913. Pp. viii and 208. Price 4s. net.

This small handbook, written by one of the physicians at Vichy, gives a description of the various springs with the composition of the waters and the indications for their use. As is usually the case when reading about spas, the indications for the use of the cures far outnumber the contra-indications. The book should be useful to refer to when considering the advisability of sending a patient to Vichy. One need not necessarily accept all the statements as having an experimental basis.

W. S. H.

Medical Annual, 1913. Bristol: John Wright and Sons. Pp. cxxv and 871. Price 8s. 6d. net.

This publication is too well known to require much description; the present number is the thirty-first of the series, and it maintains the high level of excellence which has characterized its predecessors. Its catholic spirit and the authoritative position of its contributors render it an invaluable epitome of the progress of medicine during the past year.

W. S. H.

Lewis's Pocket Case Book. By H. K. Lewis. London: Price 1s. 6d. net.

This is a handy little pocket book for the recording of cases, four pages are allotted to each case, and there are spaces for the insertion of all the usual particulars. In addition there are diagrams for the

recording of physical signs and temperature charts to cover an illness of three weeks' duration. The book measures 8 in. × 5 in., and is of convenient size for slipping into the pocket. It should be very useful for keeping private records of one's more interesting cases.

W. S. H.

Current Literature.

Standards to be applied to Sewage and Sewage Effluents discharging into Rivers and Streams.—In the Eighth Report of the Royal Commission on Sewage Disposal the question of the standards to be applied to sewage and sewage effluents and the tests which should be used in determining those standards are again discussed. The Commissioners state that the most delicate chemical index of recent sewage pollution of a river water is to be found in the figure for ammoniacal nitrogen, but the figure is not equally reliable as an indication of the *character* of the pollution, as shown by the effect which the discharge of a given sewage liquor is likely to have upon the stream. Their investigations show that the nuisance-producing power of a normal sewage or effluent is broadly proportional to its power of deoxygenating the water of a stream, and that tests which are based upon the rate and degree of absorption of oxygen are the most trustworthy for determining whether nuisance is likely to be created in a stream by the discharge of such liquids. The test for oxygen absorbed in four hours from permanganate is more speedily performed and easier to work than the test for dissolved oxygen taken up in five days, which is, in essence, a bacteriological test. But the Commissioners think these advantages are outweighed by the following considerations: (1) The five days' test reflects more accurately than the permanganate test the observed conditions of streams; (2) the five days' test represents more naturally the actual process by which the more readily oxidizable constituents of the polluting matter absorb the oxygen dissolved in the river water. Permanganate, on the other hand, is a vigorous oxidizing agent which may oxidize substances contained in the polluting matters which would not take up dissolved oxygen under natural conditions. (3) Laboratory experiments have shown that the five days' test shows smaller differences in the quality of water. The Commissioners, therefore, think that the dissolved oxygen absorption test should be adopted for purposes of a standard. A chemical standard may be applied either to the contaminating discharge itself, viz., sewage or effluent, or to the stream which has received the discharge. But a standard applied to a river water which has received the polluting discharge would be very difficult to administer, would distribute the burden of purification unequally, as between different authorities in the same watershed, and would go further in the direction of differentiation than is necessary to secure economy. Consequently, a normal standard for effluents is given and the Commissioners recommend "that in the cases in which a complete system is called for the effluent should not contain more than three parts

of suspended matter per 100,000, and that, *including* its suspended matters, it should not take up more than two parts of dissolved oxygen per 100,000 in five days at 65° F. (18·3° C.)." In the Fifth Report it was stated that an effluent would be satisfactory, if after being filtered through filter paper it did not absorb more than 1·5 parts by weight per 100,000 of dissolved or atmospheric oxygen in five days. But subsequent investigations having shown the practical difficulties in the way of removing suspended solids in a uniform manner, either by filter paper or otherwise, the removal of suspended solids is not now required, and the oxygen figure absorbed is changed to two parts per 100,000. The Commissioners realize that an effluent which takes up two parts of dissolved oxygen in five days will need some dilution if nuisance is not to be caused. The minimum degree of dilution is obtained by applying a certain formula which shows that if the effluent is diluted by eight times its volume of river water a nuisance is not likely to occur. The Commissioners think it may safely be assumed that the great majority of effluents are diluted by more than eight times their volume of river water.

Where the volume of the stream is very small specially stringent standards may be required, but the Commissioners consider that such cases are likely to be exceptional, and each case must be considered on its merits. A relaxation of the normal standard may be entertained: (*a*) When it can be shown that the particular river water is of such quality and volume that when mixed with a sewage or sewage liquor of known or calculated strength and volume it does not, or would not, take up more than 0·4 part per 100,000 of dissolved oxygen; and (*b*) when there is reason to suppose, or when it can be shown, that the river will receive no further pollution until it has recovered itself so far as not to take up in five days an amount of dissolved oxygen much in excess of that which it took up before receiving the first discharge.

The Commissioners think that for the discharge of partially purified or unpurified sewage into a stream two conditions are essential, viz.: (*a*) Sufficient dilution with comparatively clean water, and (*b*) sufficient reduction of the suspended solids.

For strong precipitation liquor, strong septic tank liquor and strong crude sewage, the dilutions with clean water should be 150, 300 and 500 respectively. With regard to the reduction of suspended solids a standard of 6 parts of suspended solids per 100,000 should be adopted where the dilution while not less than 150, does not exceed 300 volumes. Where the dilution is more than 300 volumes, but less than 500, a standard of 15 parts per 100,000 might be permissible. Where the dilution is so great, say over 500 volumes, that no treatment is considered necessary, the standard would be in abeyance. But for the sake of the appearance of the river the grosser solids, such as undisintegrated fæces, paper, &c., should, as far as possible, be held back, and the provision of some effective form of screening apparatus should be insisted on wherever practicable. Settlement of grit and the heavier particles of suspended matter is also desirable.

W. H. H.

Paratyphoid and Pseudo-paratyphoid Bacilli.—Weber, who is Director of the Imperial German Board of Health, and Haendel contribute an important paper to the *Berliner klin. Wochenschrift*

(November 18, 1912, p. 2205) on Paratyphoid and Paratyphoid-like Organisms, with special reference to their distribution in Nature.

Cultures of the typho-coli group of bacteria when grown in milk, litmus-milk, litmus-mannite-nutrose solution of Hetch; Barsiekow's glucose and lactose fluids, on Loeffler's malachite-green-agar; neutral red-agar, orcein-agar, glucose-agar and lactose-agar, can be divided into: (1) *Bacillus typhosus*; (2) the *paratyphoid* B, the *B. enteritidis* (Gaertner), and strains culturally similar; (3) *B. coli communis*.

The second group breaks up under serological tests into three sub-groups: (*a*) *B. paratyphosus* B, Schottmüller, and the strains which resemble it in culture and serologically, viz., *B. suipestifer*, *B. psittacosis*, and *B. typhi murium*, and food-poisoning bacilli; (*b*) the Gaertner group, which includes the various kinds of rat virus; (*c*) the strains, the cultures of which are similar to *B. paratyphosus* B, or *B. enteritidis* (Gaertner), but are not agglutinated by paratyphoid B and Gaertner sera. The term paratyphoid should be restricted to sub-group (*a*).

It is not possible to differentiate between the varieties of these sub-groups by cultural, serological, or animal tests.

These are found in the intestinal contents of normal animals, in the organs of healthy beasts slaughtered for consumption, in sausages, meat and other foodstuffs, in water and ice; in the dejecta of healthy men with whom there has been no question of paratyphoid fever or food-poisoning, or contact with persons so suffering, bacteria are found which are indistinguishable from *B. paratyphosus*, and *B. enteritidis* (Gaertner). These bacilli, therefore, are widely scattered throughout Nature.

C. B.

Post-mortem Examinations of Typhoid Carriers.—Bindseil (*Zeitschrift. f. Hyg. u. Inf.*, May, 1913, p. 369) reviews the records of post-mortem examinations of typhoid carriers. He cites five cases in which the *Bacillus typhosus* was recovered from the liver tissue, and he relates one which came under his own observation. A woman suffered from a twelve-day attack of enteric fever in the year 1906 during which the typhoid bacillus was grown from her blood. She became a carrier and died in 1912. Bindseil found the *B. typhosus* in the gall-bladder and in its submucous coat; in gall-stones, bile ducts, and the liver; and also in the contents of the small and large intestine. In the stomach contents, spleen, kidneys, mesenteric glands, pancreas, heart's blood, bone marrow, and urine this micro-organism was not detected.

C. B.

Treponema found by Brain Puncture.—Forster and Tomasczewski (*Deutsch. med. Woch.*, June 26, 1913, p. 1237) removed during life portions of the cortex of the brain in six cases of general paralysis by means of the cerebral trochar used in animal inoculations. In two, *Treponema pallidum* was discovered in small numbers under the dark ground illumination.

C. B.

Antimony in the Treatment of Syphilis.—Tsuzuki (*Deutsch. med. Woch.*, May 22, 1913, p. 985), after curing experimental syphilis of rabbits with bitartrato-potassium-ammonium-antimony-oxide [$SbO(C_4H_4O_6)_2$]

$K(NH_4)_2H_2O$, which he calls antiluetin, has tried its action on men. When administered by subcutaneous injections in doses ranging from 0·025 to 0·05 grm. every four or five days until 0·75 grm. has been given, antiluetin has exercised a beneficial influence in syphilis, which has been increased by combined treatment with the older anti-syphilitic remedies.

C. B.

A Good Medium for the Culture of the Gonococcus.—P. Emile Weil and Noire (*Comptes rendus de la Société de Biologie*, June 27, 1913, p. 1321) precipitate the casein of a litre of milk by means of 2 c.c. of hydrochloric acid. After neutralizing the whey with soda, they mix it with half its volume of a 2 per cent watery solution of peptone; 1 per cent cane sugar and 0·35 to 0·4 per cent urea and 1·6 per cent agar are added, and the mixture is sterilized in the usual manner. The authors find that this agar gives better growths of gonococcus than Wertheim's ascitic agar. The amount of material inoculated should be large and should be taken directly from the urethra. The tubes must be put into the incubator immediately. The gonococcus remains alive on this medium fifteen to twenty days.

C. B.

Quinine Ointment in the Prophylaxis of Syphilis.—Schereschewsky (*Comptes rendus de la Société de Biologie*, June 6, 1913, p. 1147) inoculated monkeys on both sides of the forehead with human syphilitic material. Two to four hours afterwards he applied an ointment containing 40 per cent of quinine hydrochlor. to the lesions on one side, maintaining the friction for three minutes. After the usual incubation period chancres developed on the side which had not been treated with the quinine, but the other side remained free from all syphilitic manifestations. Hence he concludes that the application of a 40 per cent quinine pomade can destroy the *Treponema pallidum* four hours after it has gained access to the skin or mucous membranes.

C. B.

Venereal Prophylaxis in the U.S.A. Navy.—Bachmann (*Journal of the American Medical Association*, May 24, 1913, p. 1610) recommends as a prophylactic against venereal disease an ointment containing 33·3 per cent calomel and 2 per cent tricresol in benzoated lard. This preventative has been issued to the battleships of the Atlantic by the Navy Department, U.S.A. Of eleven men who were exposed to the same source of gonorrhœal infection, nine who used the ointment escaped, but two who omitted to do so contracted the disease.

C. B.

Extracts from the Official Report on the Levy of Youths born in 1890 for the Italian Army.—The number included in this levy was 484,755, as against 510,916 in the previous year. This number comprises 134,033 men who were born before 1890, but who were exempted or omitted from the list referring to that year; 350,722 men born in 1890 are included; 12,223 names were cancelled from the list for the following causes: Death, 11,150; abroad, 124; names twice entered,

388; excluded from service under Law 3, 91; wrongly included, 454; excused from serving, 16.

Certain modifications of the medical regulations previously in force as to fitness for service were carried out:—

(*a*) That in the case of serious constitutional debility, or organic degeneration, of scrofula, malarial infection, syphilitic infection, and oligæmia of moderate degree, final rejection will only be carried out at the termination of the whole period allowed between the primary and final inspections.

(*b*) That only in case of severe scrofula, tubercular infection, grave oligæmia, syphilis with severe lesions, manifest cachexia (scorbutic, saturnine &c.), may absolute rejection be carried out at the primary inspection.

(*c*) That whatever the height of conscripts may be who have a chest measurement of 31·4 in. or over, they cannot be rejected for being under chest measurement, and that independently of height a chest measurement of 31·4 in. is a *sine qua non* of fitness, and a chest measurement of between 29·6 and 31·4 in. should only be a cause of rejection if it persists throughout the period between primary and final inspection.

(*d*) That in case of conjunctivitis reinspection should be performed only after observation in a military hospital in order to avoid fraud, which may be detected under supervision in such an institution.

These modifications have sensibly diminished the number of final rejections. The number of conscripts struck off altogether was 90,480.

For infirmities or imperfections	72,854 =	17·24	per cent.
For being under height	17,620 =	4·17	„
		21·41	„

The chief causes of rejection for disease or infirmity are here tabulated:—

Diseases and imperfections	Number of conscripts rejected	Percentage of the whole number of rejections	Diseases and imperfections	Number of conscripts rejected	Percentage of the whole number of rejections
Constitutional debility..	9,147	10·11	Goitres which, on account of long standing, size, hardness, and locality, cause deformity or interfere with breathing or circulation	1,804	1·99
Defects of chest development	8,853	9·78	Absence or extensive and deep caries of many teeth	1,697	1·88
Visceral hernia	6,991	7·73	Organic changes and incurable diseases of the eyeball	1,508	1·67
Oligæmia and allied cachexia	5,511	6·09	Marked atrophy of a single limb	1,251	1·38
Chronic conjunctivitis persisting over the period of observation	3,369	3·72	Excessive knock-knee	1,032	1·14
Deformities of the chest frame	2,351	2·60			
Enlarged neck	2,278	2·52			
Varicocele	2,256	2·49			
Varicose veins	2,041	2·26			
Curvatures and deformities of the vertebral column	1,874	2·07			

A table, too long for insertion, of all diseases and infirmities causing rejection is given. Some of the more striking items not detailed in the above table of chief causes are:—

	Number of rejections
Cretinism	27
Idiocy	18
Mental obtuseness	55
Mental alienation	18
Epilepsy	135
Rickets	23
Alopecia	31
Chronic otitis	112
Deafness	27
Hæmoptysis	34
Pulmonary tuberculosis	12
Congenital transposition of the heart	121
Cardiac neuroses	120
Organic heart disease	298
Loss of phalanges	38
Deformities of the feet, exclusive of hammer toe or over-riding toes	10
Excessive knock knee	164
Excessive bandy leg	111
Malformation of the feet (pes equinus)	157

H. E. R. J.

Epidemic of Typhoid Fever in the Garrison of Avignon.—Méd. Principal Simon (*Archives de Méd. et de Pharm. Milit.*, April, 1913), has contributed a lengthy article on the prevalence of typhoid fever among the troops stationed in Avignon. For the last twenty years some twenty to thirty cases of typhoid fever have occurred every summer in the garrison, the strength of which varies from 2,300 to 3,200 men. About every third or fourth year the incidence has increased to 100 or more cases. The disease has been caused by a polluted water supply. In June, 1912, the strength of the garrison was 2,170, of whom 134 were admitted to hospital for typhoid fever; in addition twenty-seven other soldiers who were on furlough in the city were attacked. In the civil population up to the end of July, 670 cases with seventy-six deaths had been notified.

A number of prophylactic measures were introduced, e.g., men were supplied with sterilized drinking water, all suspects were immediately sent to hospital for observation, and antityphoid inoculation was offered to the men and families in garrison. Vincent's procedure was adopted, and the most satisfactory dosage was found to be four doses of ½, 1, 2, and 2½ c.c. of his emulsion at intervals of eight days. No noteworthy complications or inconveniences resulted; most men were merely excused duty on the following day; out of 1,280 inoculations only some thirty cases required admission to hospital for a couple of days. Of the total 1,370 persons inoculated during the height of the epidemic not one developed typhoid fever.

C. E. P.

Accessory Ducts in the Penis.—Professor Hübner (*Berlin. klin. Woch.*, No. 16, 1913) reports several cases in which accessory ducts had become infected with gonococci. In one case, a man admitted on account of a hard chancre situated on a hypospadic meatus, was found to have a fine duct about half an inch in length opening into the fossa navicularis, and a second smaller one opening into one lip of the meatus. In another case a student presented himself with a gonococcal abscess in the skin of the dorsum of the penis. There was a minute opening into which a probe could be passed for about one inch. At a later date this duct was excised; the urethra had not become infected. The duct was lined with squamous epithelium. Similar accessory ducts occur in the female urethra.

C. E. P.

A Suggested Pack Equipment for Infantry.—Captain Strübin (*Revue Milit. Suisse*, March, 1913) describes a new form of pack equipment which he has designed. The fundamental idea is to have three receptacles in the form of rucksacks, so that in case it should be necessary to reduce the soldier's load he can do so at once while retaining the absolutely necessary articles. The carriers are made of waterproof tent canvas of a khaki colour. One takes spare clothing and boots, one carries ammunition, food and cooking utensils, the third consists of a plain piece of canvas in which the great-coat is rolled up. The total weight as also the cost of the three carriers is much less than that of the present equipment. The spare clothing carrier can be detached by merely unbuckling two straps, it can then be placed in a cart for transport. Strübin strongly recommends a small spirit stove for cooking with the mess tin when the field kitchens for any reason fail to come up. He claims that spirit is cheaper than wood and saves all the trouble of making fires.

C. E. P.

Water Sterilizers and Ice Machines with the Troops in Morocco. (*Archives de Méd. et de Pharm. Milit.*, May, 1913, p. 482). Chavasse, in his inspection report of Western Morocco, November, 1911, gives the following notes on the water sterilizer. A two-wheeled "Lefebvre" vehicle carried a water sterilizer of the "Salvator" type. The apparatus weighed 18 cwt., required three draught mules, and used wood and coal as fuel. A similar vehicle was fitted up for the manufacture of ice. A third vehicle of the same kind carried spare parts, tools, &c. The three formed a group; one corporal and three men, all specially trained mechanics, were in charge of the group.

(*a*) *The Water Sterilizer.*—This apparatus used 18 lb. of dry wood and 35 lb. of good briquettes for four hours' work; in this time it delivered 195 gallons (900 litres) of water which had been heated to 115 to 120° C. It had a coarse filter composed of sponges, which had to be cleaned once a week. The vehicle could travel along the tracks in Morocco except after heavy rain had fallen. The hand feed pump would only lift water from a depth of 10 to 12 ft. Much suspended matter in the water seriously interfered with the working of the apparatus. When the water was clear and did not contain much lime the apparatus worked for three to four months without requiring to be cleaned out; when the water was rich in lime salts the boiler had to be scaled every four months, as otherwise the output fell to one half, and it was difficult to raise the water to the proper temperature.

(*b*) *The Ice Machine.*—This apparatus, "système Douane," employed chloride of methyl as the freezing agent, and furnished 11 lb. of ice in one and a half hours; during very hot weather when the water used for cooling was very warm the machine had to be run for two hours, and did not then produce a solid block of ice. Some trouble was experienced in working the machine during high winds. The apparatus used 2¼ pints of petrol and 17 oz. of lubricating oil each hour, also 60 gallons of water for cooling the motor; it required a charge of 13 lb. of chloride of methyl, which lasted for four months. It was capable of travelling along the rough tracks which represented roads in Morocco; the motor required

specially trained personnel to look after it and even then frequently broke down.

C. E. P.

The Military Training of Weakly Men.—Méd. Major Bichelonne, 111th regiment d'infanterie (*Archives de Méd. et de Pharm. Milit.*, February, 1913) describes a satisfactory experiment tried with a number of recruits who on medical examination were considered physically unfit for military service. Some fifty-four of these asked to be permitted to join the regiment, and to try to put in their service. With the exception of two excessively obese men, only ten of the number exceeded 110 lb. in weight, and all of them were of very poor physique; while some had also suffered from a preceding illness which had left some permanent damage of one of the principal organs. They were formed into two special squads (pelotons de robusticité), and were put through a graduated system of exercises, beginning on November 8, 1911. By March 12, 1912, twenty-two of the men had developed sufficiently to take their places in the ranks of the regiment, and by the end of April the remainder of the squad was able to do so. C. E. P.

Courses of Instruction for Officers of the Army Medical Service—France.—Fresh instructions (Circular No. 49, *Direction du Service de Santé, Bull. Service Santé Militaire*, No. 640) have been issued prescribing courses of instruction for all active and auxiliary medical, pharmacist, and administrative officers of the Army to prepare them for their duties on mobilization. The courses will be held at different centres to suit the convenience of officers ordered to attend. Each course will consist of ten days' theoretical instruction; towards the end of April practical exercises lasting four days will be carried out in the country. A special teaching staff will be appointed in each centre. This will consist of 1 general staff officer for tactical instruction, 2 senior medical officers, 1 pharmacist, and 1 administration officer; in addition to the above, 1 medical and 1 administration officer are allowed as instructors for auxiliary officers during the practical exercises, for which the following medical units will be formed: 2 ambulances, 1 groupe divisionnaire de brancardiers, 1 section d'hôpitalization, 1 hôpital d'évacuation, and a couple of wagons fitted up as an improvised ambulance train. The lectures will be on: Army medical organization in the field, map reading, tactics, mobilization, and supplies. During the last three days medical, pharmacist, and administration officers attend separate demonstrations on medical equipment, pharmacist's duties, and the civil law regulating requisitions, &c., respectively. The practical exercises comprise: the mobilization of field medical units, the establishment of the medical échelon at the front, and the evacuation of wounded.

C. E. P.

The Aeroplane and the Medical Services in the Field.—During the French manœuvres of 1912, Reymond (*Archives de Méd. et de Pharm. Milit.*, May, 1913), a member of the French Senate, made some experiments to test the value of aeroplanes to the medical services in the field. He was asked to reconnoitre a certain area and to locate some 100 dummy wounded who were distributed in various places; this he succeeded in

doing satisfactorily. As a result of the experience gained, he has come to the following conclusions:—

(1) Aeroplanes can be used to search an area for wounded. To be able to distinguish groups of wounded, the aviator must not fly at a greater height than 900 ft.; when he finds what he thinks is a group of wounded, he must descend to 150 ft., and re-examine the object to make sure. It is extremely difficult to detect a single wounded man if he lies motionless on the ground, but a slight movement, such as waving a handkerchief, is sufficient to attract the aviator's attention. In the event of aeroplanes being used to search for wounded, all men should be taught to make some signal when they hear the engine of the aeroplane.

(2) It is easier for an aeroplane to examine a large area than a small one; one aeroplane to each Army Corps should be sufficient.

(3) The aeroplane should be piloted by the observer, as it is essential that the machine should be turned instantaneously towards any object which it is desired to examine more closely. If the desired direction has to be explained to another person, the aeroplane would, on account of its speed, almost certainly pass beyond the objective before the pilot could be made to understand what the observer wanted.

(4) An aeroplane could be usefully employed for communicating between the D.M.S. of the army and medical units on the line of communication. It could also be used to bring up fresh supplies of dressings.

(5) In colonies where means of communication are primitive, a medical officer could be rapidly conveyed to an outlying post.

C. E. P.

A Folding Metal Stretcher for Cyclist Companies.—Méd. Major M. le Guelinel de Lignerolles (*Archives de Méd. et de Pharm. Milit.*, April, 1913). The description of this device is as follows: Two steel tubes of 28 mm. to 30 mm. in diameter are connected by traverses of the same metal; each tube (forming a pole) folds into three parts. The joints are fixed in the straight position by Gladiator sleeve fastenings. The two traverses of steel tubing are placed one at the head end of one of the handles, the other at the foot end of the other handle, and fold upon the handles when not in use. Each handle has one traverse permanently connected to it by a hinge and socket, the other end of the traverse being detachable. For use they are fixed at right angles to the handles by means of sockets with a pin and two locking sleeves.

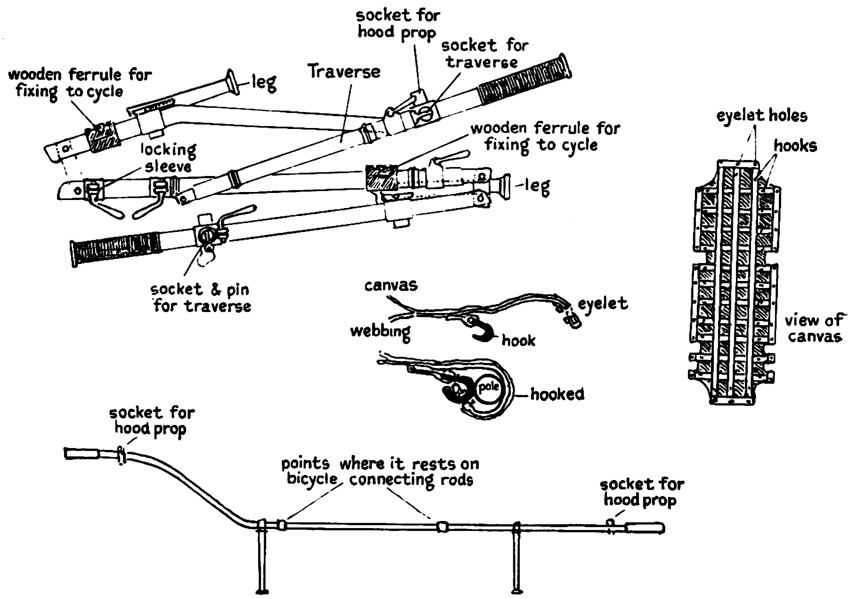
The diameter of the handles being less than that of wooden handles, for which the cycle carrying rods were devised, ferrules of wood are placed over the tubes where they come in contact with the supporting bicycle cross-bars to increase their diameter. The grip of the handles is capped with string to prevent slipping of the hands during hand carriage. The poles are furnished with two legs each, which fold upon them, and the poles are curved to raise the head end of the stretcher.

The canvas is strengthened by means of webbing strips sewn longitudinally and transversely to it. It is attached to the handles and traverses by eyelet holes of copper, at 10 in. intervals, in which iron hooks engage when the canvas is folded round the poles and traverses. The hooks are attached to the canvas by pieces of leather sewn to it. The hooks and strips are sewn to the under surface of the canvas.

The head end of the canvas has a pocket which can be filled with

soft material to form a pillow. A hood with steel supports fixed into sockets on the upper surface of the handles is provided for use in bad weather or hot sun.

Shewing one side of stretcher frame partly folded



Lateral view of frame

The cost of the stretcher is about £7. Its weight, without the hood, is about 23½ lb. It is intended primarily for use by cyclist troops, and for this purpose one half of the stretcher and one half of a set of two connecting rods are carried by each cyclist. It has been tested for strength and can carry men of 15 st.

H. E. R. J.

Correspondence.

AN INCIDENT OF 1780.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In my article, concerning medical affairs during campaigns of 1760 to 1818, which appeared in the May, 1913, number of this JOURNAL, I find that a mis-statement was made which, for historical accuracy, calls for correction. In the affair of September 5, 1780, when Baillie's force was cut up by Hyder Ali, it is stated that Colonel Baillie and Surgeon Wilson belonged to the 73rd Foot. As a matter of fact, both belonged to the 4th N.I. I find that Colonel Baillie died in prison in Seringapatam, in 1797. I am indebted for the clue as to an inadvertent mis-statement by myself, concerning Baillie and Wilson, to Colonel Johnston, formerly of our service, who was attracted to the incident by a reference to the 73rd Foot, a regiment concerning whose records he is particularly interested and informed. In the original documents, in which quotations from Baillie's letters appear, he is certainly described as of the 73rd, but how that record arose one cannot say. To those documents I owe the error in my article, which I now correct.

In the same article, p. 538, is a reference to the fact of Surgeon John Leyden being a poet. To Colonel Johnston, I am indebted for the following quotation from Scott's "Lord of the Isles," which may interest those inclined to literature :—

"Scenes sung by him who sings no more,
His bright and brief career is o'er,
And mute his tuneful strains;
Quenched is his lamp of varied lore
That loved the light of song to pour;
A distant and a deadly shore
Has Leyden's cold remains."

I am, &c,

Chirat,
July 23, 1913.

R. H. FIRTH,
Colonel.

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THE PROGNOSIS IN BILHARZIASIS.

BY MAJOR W. S. HARRISON.

Royal Army Medical Corps.

THE question as to how long bilharzial infection may be expected to continue is one of considerable interest both to the State and to the unfortunate host. Hitherto there has been very little definite information on the subject; Sandwith[1] states that most cases cease to pass eggs within three years of leaving the endemic area. Our experience, however, of the cases which were infected during the South African War has shown us that the parasite is much longer lived than had been supposed hitherto, and there seems to be no doubt that it is a cause of much more disability than is generally imagined, even allowing for the natural exaggerations of men whose pensions are periodically in jeopardy. This seems to be especially the case among men who have to earn their living by physical labour; it is quite a usual thing to find that, whereas the patient is practically free of unpleasant symptoms whilst resting in hospital, as soon as he resumes hard physical labour there is an increase in the amount of blood passed and in the symptoms of bladder irritation. Cottell[2] reported the results of an analysis of 626 cases, mostly contracted during the South

[1] "Medical Diseases of Egypt," p. 234.

[2] JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xviii, 1912, p. 434.

African War; of these 65 had been struck off the list as apparently recovered and 202 had ceased to come up for examination for various other reasons. I have recently had the year by year records of these same cases put into my hands and have thought that it would be useful to analyse them still further with a view to supplementing the information given in Lieutenant-Colonel Cottell's paper. The records consist of abstracts from the yearly or half-yearly reports on pensioners; of these there were 466 in which the record was sufficiently long to be of value, that is to say, covered a period of at least six years or had ceased because of the apparent recovery of the pensioner. The standard of apparent recovery which I took was that repeated examinations for two years or more had failed to reveal the presence of blood or ova in the urine. The majority of the records extended over a period of ten years or more.

Blood had been absent from the urine for two years or more in 141 cases out of the 466, but in 23 of these ova were still being passed, leaving 118 cases in which neither blood nor ova had been found for two or more years. In 71 of these cases the disease had lasted over seven years before blood or ova ceased to be found, while in 37 cases these signs of the disease had disappeared in less than seven years; in 10 cases the duration of the disease was doubtful. The earliest period at which we may hope to find the urine permanently free from blood and ova appears to be five years. This happened in 15 cases; there were, however, 4 cases in which the urine was clear at four years, and 1 at three years after the onset of symptoms: but these are evidently quite exceptional cases. It may be taken then that from five to seven years is about the minimum duration of the disease, but this is true of only a small proportion of cases, certainly less than one-tenth.

Caution is, however, indicated in assuming that because blood and ova cannot be found in the urine after several examinations the patient has recovered. In 133 cases blood was still present intermittently, and of these in 21 instances ova had not been found for two years or more, whilst there were quite a number of cases in which the signs of infection were in abeyance for two years and upwards, but subsequently returned. I picked out from the records 20 such cases; it would be wearisome and of little profit to quote details of them all, but I give one or two illustrative examples:—

Private F. Disease appeared in 1902. Blood and ova were absent from the urine in 1909, 1910, and 1911; in each of these years two

examinations were made: ova were found in 1912, and both blood and ova in 1913.

Private M. Disease first noticed in 1900. Blood and ova were not found in the urine in 1905 and 1906 (four examinations at six-monthly intervals); they reappeared in 1907 and were present at every examination up to 1912.

In some cases, although blood and ova were not found on several successive occasions, the patient stated that he had hæmorrhage occasionally, and eventually the reappearance of blood and ova in the sample taken for examination showed that his statement was a true one: an example of this is the following case:—

Private W. Disease contracted in 1901. Neither blood nor ova were found in 1905, 1906, 1907, and May, 1908. In October, 1908, he stated that he had twice suffered from hæmorrhage in the last six months, but neither blood nor ova were found at the time of examination. Blood and ova were again absent in 1909, but the man stated that he had had hæmorrhage four times since the last examination, similarly when examined in April, 1910. At the end of 1910 and in 1911 both blood and ova were found in the urine.

It is interesting to observe that, when blood and ova did temporarily disappear from the urine, in most cases this happened between five and seven years after the onset of symptoms, which corresponds with the minimum period for recovery. The course of many of the cases very strongly suggests the possibility of reinfection from the patient's own ova (these men had all long left the endemic area). An example of this kind is the following:—

Private N. Contracted disease in 1902. Ova were not found at two examinations in 1907, but there was some blood. Neither blood nor ova were found in May, 1908, but in November, 1908, there was much blood and many ova; these continued to be present until 1912, when both again disappeared from the urine.

In 164 cases, out of the 466 with which I dealt, blood and ova were continuously present in the urine; in 5 of these the disease had lasted for thirteen years, in 16 for twelve years, and in 57 for eleven years.

There were 28 deaths, and of these possibly 7 might be attributed directly or indirectly to bilharziasis, but of these 7 cases 2 are open to doubt. One was a case which died of "carcinoma of the bladder," and ova were only found in the urine once out of two examinations made a year before death, these being

the only examinations that were made. In the other case death was attributed to bilharziasis (ten years), the immediate cause of death being internal hæmorrhage. This patient was reported to be "healthy" two months before the date of his death, and it is more than likely that the hæmorrhage was due to some other cause. Of the remaining 5 cases, 2 died of nephritis, 1 from mesenteric thrombosis after a prolonged illness with pyelonephritis, 1 was said to have died of anæmia and exhaustion caused by bilharziasis, and in one case the cause of death was given as "bilharzia"; in this patient the rectum also was involved.

The remaining 21 deaths were in no way connected with the bilharzial infection; of these 8 were due to tubercle, 7 of them being tubercle of the lung and 1 tubercle of the spine with lung infections also. At first sight this might appear to be an excessively high mortality for tuberculosis, and one might be tempted to consider that reduced vitality from bilharziasis with its concomitant reduction in earning power had increased the tendency to phthisis. Reference to the Registrar-General's reports shows that 29 per cent. of all deaths of males between 25 and 45 are due to phthisis, whilst, if one may be excused for making a percentage on such small figures, in the records we are dealing with the deaths from phthisis form 28 per cent. of all the deaths. The remainder of the deaths were due to various diseases which could be in no way connected with bilharziasis.

Conclusions.—It is obvious that bilharziasis is a much more prolonged disease than we have been accustomed to think. The earliest period at which we may hope for recovery is from five to seven years after the onset of symptoms, and this in only one-tenth of the cases, whilst it may last without relief for at least thirteen years. The direct and indirect mortality from bilharziasis among Europeans removed from the endemic area is probably not more than about 1 per cent, and there is no reason to suppose that biiharzial infection increases the tendency to phthisis.

PHLEBOTOMUS FEVER AND DENGUE.[1]

By Lieutenant-Colonel C. BIRT.
Royal Army Medical Corps.

After an incubation period of from four to seven days, phlebotomus or sand-fly fever is ushered in with violent headache, chiefly confined to the forehead and back of the eyes; pains in the calves of the legs; discomfort in the epigastrium; stiffness of most of the muscles of the body; the face is deeply flushed and the features are swollen; the conjunctivæ are injected; vomiting occurs in a quarter of the attacks, and diarrhœa almost as frequently, but constipation is noted in the majority of instances; the temperature rises rapidly to 101° F. to 103° F., and falls gradually to the normal level on the third or fourth day; the pulse remains slow throughout the illness; leucopenia, with a relative decrease in the polynuclears, is an almost constant sign; there is considerable debility during convalescence; in an epidemic, more than 90 per cent of the cases are first attacks, hence a high degree of immunity is afforded after recovery.

This fever is accurately described in Pym's "Bulam Fever," in W. Burnett's "A Practical Account of Mediterranean Fever," and in J. Hennan's "Medical Topography," which were published between the years 1814 and 1830. So exact were the observations of these early physicians that the absence of leucocytosis did not escape them. Bleeding was the universal remedy at that time, and in 1816, Dr. Skey, quoted by Hennan, remarked that it did not often happen that the blood of patients suffering from the Malta summer febricula had a buffy appearance; he noted it once only in twenty-eight cases. Also, in 1822, Lightbody noticed that the buffy coat was absent during the summer, in the sand-fly season, but that it was observed in the autumn, when yellow fever was prevalent at Malta. There is generally an initial leucocytosis in yellow fever.

The Army Medical Reports date from 1817, and the Statistical Reports on the Health of the Navy from 1830. We meet with excellent clinical pictures of sand-fly fever in these volumes, and we learn how widely prevalent it was during the summer months throughout the whole Mediterranean area, including Gibraltar,

[1] Reprinted from the *Transactions of the Society of Tropical Medicine and Hygiene*, vol. vi, No. 7.

Malta, the Ionian Islands, Greece, Cyprus, Crete, Asia Minor, and Egypt.

In 1905, Taussig [1] contributed a masterly article to the *Wiener klinische Wochenschrift* on the short fever which breaks out every summer among the Austrian troops stationed on the Adriatic coast in Bosnia and Herzegovina. He adduced epidemiological evidence that the phlebotomus, a figure of which he gave, should be regarded as the agent in the transmission of the disease. Our Indian investigators were thus forestalled, though McCarrison stated in a paper on a kindred ailment in Chitral, which he had studied in 1903 and 1904, inserted in the *Indian Medical Gazette* of 1906, "with regard to suctorial insects, sand-flies are those most likely to be implicated. Their appearance corresponds in a striking way with the appearance of the disease, and the fact that they are not found where the disease does not prevail may be more than a coincidence. Experiments in my hands have, however, failed to throw any light on this point. The very great difficulties in working with sand-flies may be responsible for this lack of result." And further on, "the use of sand-fly and mosquito-proof curtains is also essential, as much for the sake of comfort as for the possible protection which may be afforded against the disease." Fooks, writing in the *Indian Medical Gazette* of 1908 and 1910 of an outbreak of about 100 cases of a similar fever in 1899, at Landi Kotal, a frontier post west of Peshawar, stated that he thought sand-flies were the means of conveying the infection, since there were no mosquitoes, but the sand-flies were abundant. His opinion was confirmed by a study of another epidemic at Sialkot in 1907.

In the year 1908, Doerr [2] announced the results of his experiments on the infectivity of the blood of the Dalmation summer fever, and on the mode of the transmission of the virus by the phlebotomus. Since then the closely related ailments in Malta have been investigated in a similar manner. Tedeschi and Napolitani [3] have made a similar inquiry into the nature of the Italian "summer influenza." Kilroy [4] has put to the test of experiment the causation of the fever as it occurs in Crete.

On combining the successful experimental results it is found that :—

(1) The subcutaneous injection of blood or serum withdrawn during the first twenty-four hours of the patient's illness caused fever nineteen times.

(2) Inoculation with the filtrate obtained by passing the diluted blood through a porcelain candle which retained the *Micrococcus melitensis,* excited the disease fourteen times.

(3) Feeding experiments with infected sand-flies were successful on twenty-one occasions.

This evidence is sufficient to show that the fever is specific, and that it is caused by a filter-passing virus, which circulates in the blood during the first day of the illness, and that it is conveyed by the phlebotomus.

The movements of our soldiers and sailors have formed an experiment on a vast scale. Every year for the last century hundreds of susceptible subjects have been transported to localities where phlebotomi abound, and the number of cases of fever which have arisen after their exposure to the bites of these insects has been registered with great precision. We learn that a large proportion of our soldiers and sailors were attacked with this fever during their first summer of residence in phlebotomus-haunted places; sometimes as many as 55 per cent of the new arrivals have been infected.

On the other hand, the naval and military forces which have been despatched to tropical and subtropical parts where the sand-fly does not exist have been exempt from this infection; for instance, in Bermuda, of which the writer has personal knowledge, the phlebotomus is not found, but culex and stegomyia are abundant; "summer influenza" is unknown, although epidemics of dengue and yellow fever have broken out at rare intervals in times past.

When examined with the aid of a pocket lens, a phlebotomus is immediately recognized by its form and its very thick hairy coating, which obscures all the fine details of its structure. On removal of this dense clothing, slender microscopical differences may be observed in the venation of the wings, the length of the segments of the palps, the number and arrangement of the bristles or spines on the claspers, &c., on which entomologists base a classification, but up to the present there has been little agreement amongst them; a species has been given more than one name, not only by different entomologists but sometimes by the same.

Grassi [5] has studied the life-history of the phlebotomus in Italy, and Marett [6] in Malta. It breeds in caves and in the interior of rubble walls. The eggs hatch in six to nine days after being laid; the larval stage lasts about eight weeks, and as pupæ they exist fixed in crevices in fragments of stone for a fortnight. The flies survive in captivity about ten days only, hence great difficulties are encountered in tracing their history. The phlebotomus is widely scattered throughout the tropical and subtropical world, and sand-fly fever is almost equally prevalent.

Franca [7] states that the phlebotomus occurs at Collares on the coast of Portugal, north of the mouth of the Tagus, in the months of August to October, and reports that sand-fly fever prevails. In the "Statistical Report on the Health of the Navy" for 1833 we read of an outbreak of 285 cases of summer febricula in H.M. ships anchored in the Tagus.

In Gibraltar the phlebotomus is indigenous. In 1804 sand-fly fever was studied by Pym, and there have been annual epidemics ever since, though of recent years the number of cases has been decreasing.

The existence of phlebotomus and of the fever in Corsica has been made known recently by Leger and Seguinaud [8].

Langeron [9] finds that the phlebotomus is scattered throughout the south of France.

The sand-fly is distributed through the whole of Italy, and is abundant in Rome, Naples, and Venice. Numerous writers report the prevalence of the infection in all parts. Tedeschi and Napolitani have made extensive researches in the ætiology of the "summer influenza" of Italy.

In Sicily, "Gabbi [10] has reported the occurrence of the fever at Catania, Palermo, and Partenico. Castro states that it breaks out every year among the troops in Milazzo. The writer captured the phlebotomus at Taormina. They are abundant in places where the disease prevails.

In Malta the preventive measures arising from the recognition of the transmitting agent have been effectual in reducing the incidence of sand-fly fever. In 1809 there were 253 attacks registered among the British troops; they fell to 124 in the following year; in 1911 there were 125 cases, and last year, I believe, there was a further reduction.

The Ionian Islands—Corfu, Paxo, Santa Maura, Cephalonia, Ithaca, Zante and Cerigo—were occupied by the British during the first half of last century. Every year summer epidemics of this fever are recorded. In 1828, at Santa Maura, the epidemic began in June and ended in November, but not before almost every individual had been attacked.

Doerr and Russ [11] have continued their researches on the fever in Bosnia and Herzogovina, of which Franz and Kolar [12] have made a clinical study. According to these authors the disease is prevalent in the Balkans. Professor Leon [13] announces that he has captured the phlebotomus in Roumania, and Galli-Valerio [14] and de Jongh have found it north of the Alps in Canton Waadt, Switzerland.

Aravandinos [15] states that these flies are common in Greece. He has observed the occurrence of phlebotomus fever in Athens. In the *Naval Reports* it is seen that cases originate at Platea and throughout the Mediterranean generally, including the Riviera.

At Crete, Fleet-Surgeon Kilroy and Surgeon Adshead studied the infection experimentally. Miorcec and Laplanche [16] state that more than half the detachment of 200 French troops were attacked in July and August, 1910.

Sand-fly fever was very prevalent among the British troops at Cyprus during the early years of the occupation. A few cases are still recorded annually.

Mühlens [17] announces the presence of the phlebotomus and of the malady at Jaffa and Jerusalem. In 1864 Chaplin [18] recognized this infection in Jerusalem, and distinguished it from malaria.

The fever is endemic in Asia Minor. The crews of our ships suffer when they are anchored off the coast.

From 100 to 300 attacks of sand-fly fever occur among the British troops quartered in Egypt every year. Dr. Sandwith [19] has observed cases in Cairo. Phillips [20] and Wakeling [21] also report instances in Cairo. Balfour [22] has recognized the ailment at Khartoum. The phlebotomus is found throughout Egypt and the Soudan.

Pressat [23] states that the sand-fly has been captured in Arabia and along the Red Sea.

Extensive epidemics of sand-fly fever have prevailed among the British Garrison of Aden, where the writer himself experienced an attack.

The crews of our ships in the Persian Gulf are liable to outbreaks of this fever.

India is the country in which cases of sand-fly fever are most numerous. Reference has been made already to McCarrison's and Fook's accounts of the disease at Chitral, Landi Kotal and Sialkot. Wimberley [24] described an epidemic which prevailed at Nowshera in 1910. Wall [25] has given an account of the Chitral outbreaks of 1909 and 1910. C. H. Hale [26] reported an epidemic in Kamptee in 1911; he found that camphor is effective in driving away sand-flies. Robinson and Blackham [27] state that the malady caused 848 admissions to hospital among the British troops of the Peshawar Division in 1911. Taylor and Khan [28] observed 161 attacks in the Indian troops at the frontier post Parachinar during the months of June to September, 1912. In the Annual Report of

the Sanitary Commissioner with the Government of India for the year 1910, published in 1912, the total number of cases of sand-fly fever recorded among the British and Indian troops is 1,058. It is doubted whether the great importance of this disease as a cause of disability of our troops has yet been widely realized; it is probable that there were some four or five thousand attacks in all. The "Army Medical Report of 1911" gives 1,393 admissions on account of sand-fly fever among the British troops alone stationed in India in 1911.

The phlebotomus is abundant in Ceylon, and our troops have suffered from the fever.

About 70 or 80 cases of this ailment are recorded each year in the returns of our troops stationed at Hong Kong and the Straits Settlements.

At Tientsin and Pekin, in 1911, 45 cases occurred in the British garrison when sand-flies were most numerous.

The sand-fly is widely distributed in the French possessions in Africa. Langeron reported its existence on the coast of Tunis. Foley and Leduc [29] state that it is common in southern Algeria. Roubaud [30] finds that it is extended throughout West Africa, and is abundant in Timbuctoo. In 1903, Theobald [31] wrote that phlebotomi occur in most collections of flies from West and Central Africa. It has been captured in Uganda. Newstead [32] says that it inhabits the Sudan, British Central and West Africa and Rhodesia. Manteufel [33] has reported the existence of the phlebotomus and of sand-fly fever in German East Africa. At Zanzibar, in the year 1911, 17 of the crew of H.M.S. "Pandora" were attacked with sand-fly fever.

In North America the phlebotomus has been caught in Maryland [34].

In Central America it has been reported in Guatemala. McGibbon [35] published an account of a short summer fever which prevailed at San Fernando on the west coast of Mexico in 1911. No rashes of any sort were observed; it is probable that the infection was phlebotomus fever.

According to the observations of Lutz and Neiva [36] the phlebotomus is broadly scattered throughout Brazil.

Dengue breaks out in epidemics which are far more explosive in character than are those of sand-fly fever. The infection courses swiftly through a community, until almost all susceptible people have been attacked. In a few weeks its energy will have been expended. The rashes which occur in about 70 per cent of the

cases, and the greater severity of the pains, mark off this disease from sand-fly fever in the Malta, Italian and Chitral epidemics in which the absence of skin eruptions was noted.

The infections may occur in the same locality. At Aden, in 1893, the summer outbreak of phlebotomus fever was followed by one of dengue in the autumn. No immunity was afforded by the former infection against the latter; whole families were seized; papular or urticarial rashes broke out in most cases. The writer's experience of his own attack at that time was that the joints were more painful than in the phlebotomus infection, and that the initial rash was accompanied with itching of the palms and soles. Dengue has often visited Aden, and is well known to the native inhabitants, who call it "father of the knees." In the "Naval Medical Report of 1871" we read of the devastations dengue caused in Aden in that year. The garrison and the whole population, European and native, were seized indiscriminately, so that in a few days' time all Aden, civil and military, was *hors de combat*. Swollen glands were a feature of the outbreak.

In Gibraltar and Malta dengue has appeared among the troops in the autumn at the end of the sandfly fever epidemic. It is stated that rashes and breakbone pains were prominent symptoms, hence there was no confusion in determining the infections.

In Greece, Aravandinos says that dengue arises every few years in epidemic form along the coast, and that it can be distinguished readily from sand-fly fever, to which visitors to Greece are liable.

Many excellent accounts of dengue have been published; notably that of Dr. Sandwith [37] of the infection in Egypt, and that of Fleet-Surgeon Bassett-Smith [38] of outbreaks in Bombay. There is considerable variety in the character of the symptoms observed in the various epidemics. Bassett-Smith remarked on the absence of severe bone and joint pains and of enlarged lymph glands. In an outbreak among our troops at Stanger, Natal, reported by Beveridge [39], many of the cases of which were seen by the writer, the swelling of the lymphatic glands was noted in 99 per cent of the 325 cases, along with the classical signs and symptoms of the infection.

Aberrant cases of dengue, and they occur in every epidemic, closely resemble sand-fly fever. After a similar incubation period, there is the same intense frontal headache, flushed face, injected and tender eyes, pains in the body and limbs, slow pulse, and leucopenia. Stitt [40] found that the average leucocyte count in 100 cases of

dengue was 3,200. Moreover, the late eosinophilia observed by Balfour [41] in Khartoum, by Harnett [42] in Calcutta, and by others, also occurs in sand-fly fever, so that the infections cannot be separated by microscopical examination of the blood.

H. Graham [43], of Beyrout, was the first to investigate dengue experimentally. After feeding *Culex fatigans* on dengue patients, he caused them to bite susceptible people residing in places where the disease was absent. He thus transmitted the infection to six persons. He also induced the disease by inoculating a man with an emulsion of the salivary glands of an infected culex.

In 1904, Carpenter and Sutton [44] obtained successful results with culex and stegomyia at the Isthmus of Panama.

In 1906, Ashburn and Craig [45] ascertained that the blood of dengue patients was infective, and that the virus passed through a filter which was impervious to the *Micrococcus melitensis*.

Summarizing the successful experiments, we find that:—

Inoculation with the blood of dengue sufferers caused dengue eight times.

Inoculation with filtered infective blood induced the disease twice.

Inoculation with the salivary glands of an infected culex gave rise to dengue once.

Infection has been conveyed by infected culices eight times and infected stegomyia once.

There are considerable differences in the infectivity of the virus in sand-fly fever and dengue. Blood abstracted after the first twenty-four hours in the course of sand-fly fever no longer can excite the disease. It has failed to do so in every attempt (five experiments) made. The blood of dengue patients with which the successful inoculations were performed was drawn off on the second to the fifth days of the disease.

Whereas phlebotomi are not capable of transmitting sand-fly fever until six days after feeding on a sand-fly fever patient who is in the first day of his illness, dengue has been conveyed by mosquitoes immediately after their meal of dengue blood; nevertheless the virus survives in them, for they have conveyed the disease eight to twenty-seven days after feeding on a dengue sufferer.

Graham protected families from dengue by means of mosquito curtains. E. H. Ross [46] extinguished epidemics of dengue which had been of yearly occurrence in Port Said by exterminating the mosquitoes. Stitt prevented the spread of infection from 200

dengue patients to others in the same ward by enclosing the former in mosquito-proof wire cages.

Evidence is accumulating that the stegomyia is an agent in the propagation of dengue. Legendre [47] concludes from a study of an extensive epidemic of dengue at Hanoi in 1910, that the stegomyia was the responsible vector, since the outbreak was coincident with a great increase in the number of these mosquitoes, while other species were few. The arrest of the epidemic was marked by a diminution in the stegomyiæ and an increase in the other mosquitoes. Davidson [48] remarks that stegomyiæ were everywhere during the recent outbreak of dengue at Brisbane. Lalor [49], cited by Surgeon-General Lukis, believes that the short fevers which are prevalent at Rangoon are conveyed by stegomyia.

That there is some connection between epidemics of dengue and yellow fever has long been noted. In Bermuda [50], in the year 1863, there was an autumn outbreak of dengue, which was followed in the next summer by a disastrous epidemic of yellow fever in which over 3,000 out of a population of 11,450 persons were seized. The epidemics were connected by the occurrence of atypical febrile cases in the interval. In 1881 at Malta there was an outbreak of dengue during the autumn, and sixty-nine cases of yellow fever then occurred among the troops.

There is a close resemblance between the dengue, sand-fly and yellow fever infections; they are all caused by some virus which circulates in the blood, and is capable of passing through a filter which retains bacteria; the onset of the fever is similar in many instances, and during the first forty-eight hours of the illness it may be impossible to distinguish between the infections; even later a diagnosis on clinical grounds may be unattainable, for atypical cases of dengue and yellow fever may bear every likeness to phlebotomus fever. Hence too great stress should not be laid on the symptoms of individual patients during the course of an epidemic; it is the general type of case which will give the name to the outbreak.

We now come to the consideration of the fever which Rogers [51] has described as "sporadic seven-day fever simulating dengue." The name is hardly suitable, perhaps, for of the 206 cases on which his report is based, in sixty-six only was the duration of the pyrexia seven days; in seventy-nine it was six days, and in the rest it varied from three to more than eight days. The leucopenia, slow pulse, and rashes cause little hesitation in identifying this

disease with dengue. From the blood of six patients, however, a bacillus bearing many of the characters of the *B. typhosus* was isolated, but since 1907, the date of the report, there has been no more positive evidence of the bacterial nature of the fever. Megaw [52], who himself was a sufferer, believes that it is a mosquito-borne malady. Fleet-Surgeon Clayton [53] has given weighty reasons for the belief that the so-called seven-day fever of eastern ports is conveyed by mosquitoes. Butler [54] remarks that many cases which occurred in the 1911 Brisbane dengue epidemic conformed to this type.

In Jamaica and Bermuda of recent years blood cultures have been employed in the investigation of atypical febrile diseases which have appeared among our troops, in addition to the usual microscopical and serological examinations; the upshot has been that six or a dozen or more cases occur every year in which the blood is sterile, and the microscopical and serum examinations are negative. In both islands culices and stegomyiæ are abundant and phlebotomi are absent. It is probable that such febrile attacks are caused by these mosquitoes.

In 1909 the writer was sent to Malta to look for the fever investigated by Doerr. He arrived before sand-flies had made their appearance, and before the outbreak of phlebotomus fever. In April and the beginning of May six cases came under his notice in which the duration of the pyrexia was from five days to ten days. In all of these 5-10 c.c. of blood remained sterile permanently; the serological and microscopical examinations for parasites were negative; leucopenia and a slow pulse were observed in every instance. These cases, therefore, resembled many which occur in dengue epidemics. After the commencement of the sand-fly fever season, eight more attacks with pyrexia varying from five to sixteen days were investigated with similar results. The conclusion seems justified that these were mosquito-borne infections. Sporadic cases of yellow fever may occur, and there is no inherent improbability that isolated examples of dengue may also arise. The cases of greatest severity appeared in the autumn months when the stegomyiæ were becoming more numerous, and it is not unlikely that they were the transmitting agents. Surgeon-Major Mifsud, of the Royal Malta Artillery, informed the writer that occasionally he had encountered febrile cases in which bilious vomiting and jaundice were prominent symptoms, suggesting that the stegomyia was the cause.

We should not be content with such terms as "three-day," "seven-day," "ten-day" fevers, for such expressions are inaccurate, no fever

keeps time so precisely; "remittent fever" and "pyrexia of unknown origin" are convenient names to be employed when we are overworked and fatigued. In perusing the literature of fevers we see how much more pre-occupied the writers have been with a search for a name than with finding out the cause of a disease. Much energy and ink have been expended on discussing whether a fever is "Brill's disease," "Weil's disease," yellow fever, "bilious remittent fever," "three-day," "seven-day" fever, and so forth, when an appeal to experiment would have answered the question and would have saved lives.

It would be a distinct gain to the cause of public health if infections were designated by their transmitting agency. The names "rat-flea fever," "louse fevers," "bug fever," "tick fever," "goat-milk fever," "mosquito fevers," bring vividly to the notice of the public their dangerous foes, and we thus educate them in the means to be adopted in the prevention of disease, and enlist their services for their suppression. The question of names appears to be a subject worthy of the consideration of this Society at the present time, for there is now sitting the Joint Committee appointed by the Royal College of Physicians for the purpose of revising the nomenclature of diseases, and an authoritative statement of the opinion of this Society would aid the Committee in that part of their work which refers to tropical diseases.

The practical sanitarian will insist perhaps, in the presence of an epidemic, on the destruction of all blood-sucking insects, and the reduction in the incidence of the fever will prove the value of this measure. But the expense of such a crusade may be prohibitive, and an experimental investigation will then be necessary to narrow down the campaign to the extirpation of those insects or other agencies which alone are responsible for the outbreak.

Conclusions.—Dengue, phlebotomus and yellow fevers are caused by distinct but closely related kinds of virus.

A fever lasting several days in which the examination of the blood for parasites, by culture, and by serum tests, is negative; characterized by slow pulse, leucopenia, and relative polynuclear decrease, occurring in a locality where mosquitoes are numerous, should be attributed to a virus carried by these flies, although some of the symptoms significant of dengue or yellow fever may be wanting.

REFERENCES.

[1] TAUSSIG. *Wien. klin. Wochenschr.*, 1905, vol. xviii, pp. 129, 163.
[2] DOERR. *Berlin. klin. Wochenschr.*, 1908, vol. xlv, pp. 1847-1849.
[3] TEDESCHI and NAPOLITANI. *Cent. f. Bakt.*, I Abt. Orig., 1911, vol. lxi, pp. 502-529.
[4] KILROY and ADSHEAD. *Statistical Report of the Health of the Navy*, 1910, p. 171.
[5] GRASSI. *Mem. d. Soc. Ital. d. Scienze*, 1907, Ser. 3a, 14, pp. 353-394.
[6] MARETT. JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1913, vol. xx, pp. 162-171.
[7] FRANCA. *Bull. Soc. Path. Exot.*, 1913, vol. vi, p. 124.
[8] LEGER and SEGUINAUD. *Bull. Soc. Path. Exot.*, 1912, vol. v, p. 710.
[9] LANGERON. *Compt. Rend. Soc. Biol.*, 1912, vol. lxxii, pp. 973, 974.
[10] GABBI. *Studi interno alle Malattie Tropicali*, 1912, vol. iii, No. 4.
[11] DOERR and RUSS. *Arch. f. Schiffs. u. Trop. Hyg.*, 1909, vol. xiii, p. 693.
[12] FRANZ and KOLAR. *Arch. f. Schiffs. u. Trop. Hyg.*, 1910, vol. xiv, Beiheft 2 pp. 41-62.
[13] LEON. *Cent. f. Bakt.*, 1910, Orig., vol. liv, p. 521.
[14] GALLI-VALERIO and DE JONGH. *Cent. f. Bakt.*, 1912, I Abt. Orig., vol. lxiii, p. 222.
[15] ARAVANDINOS. *Arch. f. Schiffs. u. Trop. Hyg.*, 1913, vol. xvii, p. 109.
[16] MIORCEC and LAPLANCHE. *Bull. Soc. Med. Mil.*, 1911, p. 2.
[17] MÜHLENS. *Deut. med. Wochenschr.*, 1912, vol. xxxviii, p. 2036.
[18] CHAPLIN. *Lancet*, 1864, vol. ii, p. 236.
[19] SANDWITH. *Clin. Journ.*, 1911, December, p. 141.
[20] PHILLIPS. *Brit. Med. Journ.*, 1910, October, p. 963.
[21] WAKELING. *Brit. Med. Journ.*, 1910, October, p. 1115.
[22] BALFOUR. *Wellcome Trop. Res. Lab. Rep.* 1911, vol. iv, p. 219.
[23] PRESSAT. Cited by TIRABOSCHI and BLANCHARD in "Le Paludisme et les Moustiques," Paris, 1905.
[24] WIMBERLEY. *Ind. Med. Gaz.*, 1910, vol. xlv, pp. 281, 518.
[25] WALL. *Ind. Med. Gaz.*, 1911, vol. xlvi, p. 41.
[26] HALE, C. H. JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1912, vol. xviii, p. 505.
[27] ROBINSON and BLACKHAM. JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1912, vol. xix, p. 447.
[28] TAYLOR and KHAN. *Ind. Med. Gaz.*, 1912, vol. xlvii, p. 475.
[29] FOLEY and LEDUC. *Bull. Soc. Path. Exot.*, 1912, vol v, p. 511.
[30] ROUBBAUD. *Bull. Soc. Path. Exot.*, 1913, vol. vi, p. 126.
[31] THEOBALD. *Rep. Sleeping Sickness Com.*, iii, 1903, p. 39.
[32] NEWSTEAD. *Bull. Entom. Research*, 1912, vol. iii, p. 361.
[33] MANTEUFEL. *Arch. f. Schiffs. u. Trop. Hyg.*, 1912, vol. xvi, p. 619.
[34] COQUILLETT. *Ent. News*, 1907, vol. xviii, p. 102.
[35] MCGIBBON. *Journ. of Canadian Med. Assoc.*, 1911, June.
[36] LUTZ and NEIVA. *Memorias do Inst. Oswaldo Cruz*, 1912, vol. iv, p. 84.
[37] SANDWITH. *Lancet*, 1888, vol. ii, pp. 107, 155.
[38] BASSETT-SMITH. *Journ. of State Med.*, 1897, vol. v, p. 461.
[39] BEVERIDGE. JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 1904, vol. iii, p. 333.
[40] STITT. *Bull. Johns Hopkins Univ.*, 1913, April, p. 117.
[41] BALFOUR. *Sup. Third Rep. Wellcome Research Lab.*, 1908, p. 38.
[42] HARNETT. *Ind. Med. Gaz.*, 1913, vol. xlviii, p. 45.
[43] GRAHAM. *Journ. Trop. Med.*, 1903, vol. vi, p. 209.
[44] CARPENTER and SUTTON. *Journ. Amer. Med. Assoc.*, 1905, January 21, p. 215.
[45] ASHBURN and CRAIG. *Philippine Journ. of Science*, 1907, vol. ii, p. 71.

[46] Ross, E. H. *Annals of Trop. Med. and Parasit.*, 1909, vol. ii, p. 193.
[47] Legendre. *Bull. Soc. Path. Exot.*, 1911, vol. iv, p. 26.
[48] Davidson. *Australasian Med. Gaz.*, 1911, vol. xxx, May, p. 254.
[49] Lalor. *Ind. Med. Gaz.*, 1912, vol. xlvii, p. 496.
[50] Harvey. *Yellow Fever Bureau Bull.*, 1912, vol. ii, p. 57.
[51] Rogers. *Med. Chir. Trans.*, 1907, vol. xc, pp. 171-196.
[52] Megaw. *Ind. Med. Gaz.*, 1909, vol. xliv, p. 9.
[53] Clayton. Journal of the Royal Army Medical Corps, 1910, vcl. xiv, p. 171.
[54] Butler. *Australasian Med. Gaz.*, 1911, May, vol. xxx, p. 254.

For the Bibliography of Phlebotomus Fever, see the *Yellow Fever Bureau Bulletin*, 1912, vol. ii, No. 1, pp. 116-120; and No. 2, p. 246.
Also *Trop. Dis. Bull.*, 1913, vol. i, No. 6, p. 341; and No. 10, p. 604.

For a Synopsis of the genus Phlebotomus, see :—
Summers. *Journ. London School of Trop. Med.*, 1913, April, vol. ii, Part II, pp. 104-116.

For Indian species, see :—
Brunetti. "Fauna of British India—Diptera, Nematocera," 1912, pp. 199-216.

For an extended account of the History of Dengue, see :—
Mahé. "Dictionnaire Encyclopédique des Sciences Médicales," 1883, Tome xxvi, pp. 698-738.

PHLEBOTOMUS FEVER AND PAPATACI FLIES IN ADEN.

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Though phlebotomus fever was first described as occurring in Aden in the year 1910, an examination of the annual reports for the past three years shows a large number of admissions under "Pyrexia of uncertain origin." In the annual returns, the following are the number of admissions for "Simple continued fever" and "Pyrexia of uncertain origin" amongst the British troops for the years 1907-1912 :—

Year		Number of cases
1907	Simple continued fever	75
1908	Pyrexia of uncertain origin	215
1909	,, ,, ,, ...	153
1910	,, ,, ,, ...	92
1911	,, ,, ,, ...	36
1912	,, ,, ,, ...	29

In 1907, there were 75 admissions for simple continued fever, 35 for malaria, none for enteric, and 7 for influenza. The cases of simple continued fever were distributed as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
14	3	4	11	8	10	4	5	8	2	6	0

It is noted that 90 per cent of the cases of simple continued fever were only seven days or under in hospital. From this it may be assumed that the pyrexia did not last more than three or four days; this suggests that the febricula may have been sand-fly fever.

In 1908, 215 cases of pyrexia of uncertain origin, 2 cases of enteric fever, and 72 cases of malaria are shown.

The monthly incidence of pyrexia of uncertain origin was as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	3	8	11	68	64	28	12	12	8	0

The following table shows the number of days the temperature was above normal in the different cases :—

Number of days' fever ..	1 to 4 ..	5 to 7 ..	8 to 10 ..	10 and over
Number of cases	143 ..	54 ..	11 ..	7

From this it seems highly probable that phlebotomus fever was epidemic during the months of June and July.

In 1909, 153 cases of pyrexia of uncertain origin, 3 cases of enteric, and 470 cases of malaria were returned.

The monthly incidence of pyrexia of uncertain origin and malaria was respectively :—

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Pyrexia of uncertain origin	2	2	3	6	19	15	11	15	34	39	5	2
Malaria	30	18	19	32	53	62	81	68	40	25	25	17

The duration of fever in days amongst the different cases of pyrexia of uncertain origin was :—

Duration of fever in days..	1 to 4	5 to 7	8 to 10	over 10
Number of cases	87	49	14	3

In October the 85th Company Royal Garrison Artillery were so badly affected that they were sent out into camp, and the barrack rooms scraped and lime-washed; the fever died away with the advent of the cold weather. This again suggests that papataci fever was common during the monsoon months, and became epidemic during September and October.

The high incidence of malaria was the result of the epidemic throughout India in 1908, the troops having been infected before their arrival in Aden.

In 1910, 92 cases of pyrexia of uncertain origin are shown, as against 153 in 1909; as 151 cases were treated out of hospital against 6 in the previous year, there is no diminution, but an increase. The months of July and August gave the highest admissions; the fever was of short duration, usually about three days. Three cases of enteric and 77 cases of malaria are recorded.

The monthly incidence of the pyrexia of uncertain origin was as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	8	7	8	2	9	21	20	5	7	3	2

In 1911 there were 36 cases of pyrexia of uncertain origin, 35 cases of malaria, and no cases of enteric fever.

The monthly incidence of pyrexia of uncertain origin was as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
5	0	0	13	3	3	4	3	1	3	0	1

In 1912, 29 cases of pyrexia of uncertain origin, 3 cases of enteric fever, and 24 cases of malaria are shown.

The monthly incidence of the fever was as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2	2	0	0	1	4	4	3	3	6	2	2

During the years 1911 and 1912, three-day fever does not appear to have been prevalent in Aden among the British troops.

Through the courtesy of Captain M. D. A. Kureishi, I.M.S., I have examined the hospital records of the 18th Indian Infantry, stationed at the Crater, Aden; from the arrival of the regiment on

January 12, 1912, to December 31, 1912, 108 cases of pyrexia of uncertain origin were admitted to hospital.

The monthly incidence of the fever was as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	0	1	4	6	58	37	0	0	0	0	2

The duration of the fever, in days, is shown in the following table, in the different cases :—

Number of days' fever	2	3	4	5	6	7
Number of cases	17	47	23	13	7	1

From these figures it would appear probable that sand-fly fever was epidemic during the months of June and July. During the year there were 7 cases of malaria and no cases of enteric fever. The blood from all these cases of pyrexia of uncertain origin was carefully examined for malarial parasites, but none were found. The clinical symptoms were typical of phlebotomus fever.

Symptomatology.—Amongst the cases seen at Aden the disease varies considerably in severity. In addition to the usual typical symptoms, some patients show marked gastro-intestinal symptoms, e.g., a rigor, followed by vomiting, and diarrhœa to the extent of ten fluid motions in the first twenty-four hours of the fever. A mild form of catarrhal bronchitis is not unusual, combined with a hyperæmic condition of the mouth, tonsils, and soft palate, extending to the larynx. The pulse-rate does not correspond to the temperature, and is not often above 100.

A leucopenia is always present, and continues some days after the fever has disappeared; the polymorphonuclear count varies from 55 to 60 per cent, the large mononuclears vary from 13 to 20 per cent. The duration of pyrexia averages from three to five days before the temperature reaches normal, and frequently during the last two days of the fever it is not more than half to one degree above the normal; the temperature as a general rule falls by lysis, but crisis may be seen, and has been noted to occur, when the fever is prolonged. The mortality is nil, and the disease appears to affect new-comers.

Local Distribution.—The distribution of the fever varies from year to year; during some years the fever appears most prevalent at the Crater, which is almost at sea-level, whereas in other years the Artillery and Infantry Barracks at Steamer Point (a distance of seven miles from the Crater and situated somewhat higher) appear to be more affected by the disease.

Other Fevers found in Aden.—Malaria is not endemic at Steamer Point nor at the Crater; some cases are diagnosed annually, but

are either imported or sporadic. The anopheles mosquito has not been found within recent years nearer than Sheikh Othman, nine miles distant. The troops are practically free from enteric fever, and it is uncommon amongst the civil population. The eight-day continued fever of Crombie is frequently met with; dengue occurs sporadically, but no serious epidemic has been noted since 1872-3.

The Disease Incidence and its Relation to the Temperature.—The fever appears to be most prevalent from the beginning of May to the end of October, the months of greatest incidence being June, July, August and September; it occurs during the cooler months. There is a definite relationship between the climatic temperature, humidity of the atmosphere, and the fever; the season of high temperatures and greatest relative humidity produces the highest admission rates.

Habits and Species of Sand-flies found in Aden.

Species.—Four specimens of sand-flies captured in the beginning of June were sent to the Royal Army Medical College for identification, where they were pronounced to be *Phlebotomus minutus*.

Habits.—The adults have been found with difficulty in dark areas of inhabited barracks, bungalows, native huts, and in caves frequented by camel men and sweepers. About half an hour before sunset on calm evenings the sand-flies take to flight, and are attracted by human beings, by burning lamps, by white articles such as writing paper, tablecloths, shirts and towels, on which they temporarily rest. Papataci flies are found sparsely distributed during the colder months, but increase in numbers with the outset of the monsoon from the end of May, when the temperature averages 95° F. and the humidity of the atmosphere is greater than during the colder months.

After careful searches, I have never been able to discover the breeding-places of these flies, although the geological conditions might be considered suitable to the growth of insect life which prefers slight moisture, dark, secluded caves, associated with crannies and holes, in the vicinity of human habitations, particularly where crumbling larvas, pumice, rubble and igneus sand are to be found, with slightly varying temperatures, from sea-level to a height of 1,700 ft.

In conclusion, I have to thank Mr. St. J. Hussey, I.S.M.D., for his help in assisting me to find the sand-flies.

SOME MUSINGS OF AN IDLE MAN.

By Colonel R. H. FIRTH.

This article, based on certain thoughts in idle hours, is in continuation of a similar article which was published in this Journal in November, 1912. It is not controversial, but essentially reflective; and expresses merely some of the difficulties one has experienced after reading some modern scientific literature. It presents many defects and not a few gaps, but these the reader will easily fill in for himself.

I.

The conversation at a recent dinner party turned upon the subject of women's rights and the whole suffragette question. The conversation was neither very instructive nor its general nature suitable for this Journal, but the somewhat irritable remark of a notorious cynic and bachelor who said, "Why were females made, and what is the use of sex?" though leading at the moment to some frivolous and ribald rejoinders, struck me as having a deeper and wider significance than either the speaker or his hearers realized. As the result of thinking it over, and from the purely evolutionary point of view, one is tempted to formulate the following reflections upon the cynic's two questions.

We conceive, undoubtedly, our first ancestors to have been single microscopic cells, but as time went on natural selection differentiated them into a number of species, whose mode of reproduction varied. In the least evolved species, the method was simply fission into two or more parts, entailing all loss of individuality in the parent cell. In the more evolved species, reproduction took the mode of the shedding or budding off of small portions, thereby retaining individuality to the parent cell. After a succession of sheddings and buddings, we conceive that the reproductive process of the cell lessened, and if left to itself, the cell rapidly died; but experience or natural selection led to a conjugating of two of these enfeebled cells, whereby a mutual exchange of their constituents was effected and followed by a rejuvenation and resuscitation of the reproductive powers of both cells. Looked at in this light, we draw one great conclusion, that sociality must have preceded sex. It is useless to speculate as to what sense or instinct this mutual recognition of a common advantage was due, but it is obvious that this rejuvenative co-operation must have

been of vast survival value to any species possessing it. From this sexless form of rejuvenative conjugation bisexual reproduction evolved. How, we cannot say; at most we can but conjecture, and these conjectures take the line that the next stage was a faculty or tendency for all daughter cells to coalesce, and that by degrees, of two coalescing cells, one became large, inert and unfitted for seeking out a mate, and the other became small, agile, and able to seek out and penetrate the body of its larger mate.

To facilitate the finding and fertilization of the inert cell by the active one in the subsequent many-celled forms of life, their type was, at first, hermaphroditic. Then as evolution went on there came a time when certain species ejected their sexual cells of each kind, probably into water, a medium eminently suitable, in which the male element of one organism could seek and unite with the female cell of the other. With the establishment of this system hermaphroditism ceased to be indispensable, and evolution on lines of natural selection vetoed interbreeding, by making each individual organism the possessor of male or female reproductive cells only. Any advantage from this was dependent on facility of access or propinquity, and as these facilities lessened Nature called into being hedonistic attractions between the two sexes, and to avoid waste of female cells, she caused the reproductive cells of the male to be introduced by their owner into the bodies containing the reproductive cells of the female. In the most elementary types of animal life the female cells or ova retain a simple form until fertilized; as we rise in the scale we find the ova acquiring a yolk or nutritive store to serve as food for the developing embryo. Later, the ova display a tendency to remain in the oviduct and there acquire a protective coat; and so things progress until we reach the stage when the fertilized ovum remains a longer period in the oviduct, sheltered in a developed fold of it.

In this outline we see the long but gradual evolution of the reproductive function of the female, from simple fission and detachment to complicated placental gestation; but throughout it all and with every advance in type, or preparation of the ova for fertilization, there was a corresponding tax on the reproductive system of the female, resulting in a corresponding lessening of her fertility, but associated with an increasing proportion of fertilized ova which survived to reach maturity. Synchronous with these physical changes there were psychical developments. The maternal instinct which called into being, in a female, a protective care of her eggs and the after care of the young as they hatched out, was clearly the

agent and slowly working factor which made it possible for her descendants to give up ovi-positing and to bring forth living young. Not only this, but that same maternal instinct to cherish her progeny, displayed by a primitive female of some long lost animal species, was the originator of all altruistic virtues which we now regard as the pride of civilization. If we think further, we appreciate another fact, that it was the female alone who for ages bore the burden of reducing wastage of life. The earlier type of male had but a seasonal and fugitive interest in his temporary mate, and it is only in late epochs of the world's history that the male began to afford the female assistance in the task; and, even now, it is not in all males that this sense of co-operative responsibility is fully developed. We, therefore, are forced to say that for ages the lead in mental evolution has been in the female, and in that to her we owe the origin of those altruistic characters without which family and social life would be impossible, we can answer our bachelor cynic's first question by affirming that the female is a result of evolution, to complete that harmony in the human social scheme whereby each generation should find its central source of happiness in creating, rearing and providing happiness for the next generation.

Now what about his other question, What is the use of sex? From the evolutionary point of view it might be said that the chief value of sex lies in the variation it causes, in that this generation of mankind or other species owes its inherent differences to a large number of ancestors, and the wider and more numerous these differences are the more ample is the material upon which natural selection can work to secure progressive improvement of the species. This undoubtedly is one result of sex, but does it cover the whole case? One is inclined to think it does not, and the arguments for this view may be put as follows. If we take the descendants of intermarrying of kin, we find the number of their ancestry is reduced below the average. They are inbred, and the members of those families are more unlike the average man and woman of their race than those other families who have the full or average number of ancestors. The same is true of animals, in whom by inbreeding and consequent reduction of ancestry, we can obtain the production of a high degree of unlikeness verging to monstrosity. A typical case of this kind came under one's notice quite recently. A native gentleman at Sharpur in the Punjab, much given to dog-fancying, bred continuously from the offspring of the same pair of greyhounds. One has had the opportunity to see the

ninth generation of these hounds, and anything more unlike normal greyhounds it would be impossible to imagine, so over emphasized had become the special characters of the strain. Reduced to other terms this excessive inbreeding and reduction of ancestry is nothing but the nearest approach allowed by Nature in the higher species to asexual production, or shall we say monogenesis. Now monogenesis amounts to a segregation of each individual from every other as complete as if each individual were confined on an island, and clearly facilitates unlikeness and formation of new species. Gamogenesis or bi-parental reproduction, conversely, swamps the variations and so retards formation of new species; and this would seem to be wholly an effect of sex. Further, children of a single parent obviously must have a better chance of being more like each other than the children of two parents, and anything which would make the children of a single parent more like each other would make them less like the rest of the species; so that the general effect of sex seems to be a comparative unlikeness among the members of a family, but a comparative likeness among the members of a race.

In attempting to unravel this question of function of sex, we are early impressed with the fact that gamogenesis, as opposed to monogenesis, is found exclusively among the higher animals. For this to have become so, suggests there must be some advantage from it. The advantage probably lies in the fact that though sex leads to likeness in numbers in an area or space, it does not hinder but rather accelerates unlikeness in time. Imagine a herd of antelopes threatened by wolves. Evolution will point to safety of the species by a gradual development of speed in getting away from their enemies, or an improvement in powers of scent or sight, and even of cunning or wariness. Natural selection will tend to eliminate those members of the herd which have a speed, scent, sight or wariness below the mean of the herd; the species or race will be continued by those above the mean in one or other favourable attribute. Presumably, half will be males and half females, consequently any small variation in any one quality may be assumed to occur in both sexes, and improvement in one or other of these qualities will be transmitted in the course of a few generations to the whole herd. Now if the herd had been a species whose reproduction was agamic, the variation, depending on the stress of selection under the circumstances, would generally have been large, sudden, often involving only one characteristic, and consequently favouring progression or evolution towards safety by intermittent leaps.

From this point of view, therefore, sex in these animals would be a factor towards a uniform, smooth, wider, and comparatively quick evolution. Under agamy or without sex, the herd would have tended to diverge into several incompatible races, some very swift, some very cunning, some unduly acute of vision or scent, and others relatively very deficient in these characters. Arising out of this unequal progress by evolution to safety and ability to contend with the dangers they were exposed to, the sociality of the herd would have been adversely affected by agamy, whereas by the operation of sex, sociality is encouraged, and sociality in animals is a factor essential to the development of a superior species. This is very true of man; therefore, by inducing sociality, another use of sex is disclosed.

We must not infer from the foregoing arguments that sex is in any way the origin of variations. During many ages, before that fusion of two individuals began, which we have inferred to be the origin of sex, organic evolution must have proceeded through simple fission and budding. Sex is nothing but a variation itself which has been established by the preservation of favoured races in the struggle for existence. It is questionable whether we can think of sex being even a cause of variation; if it be, it is but a small contributory cause; the inference is permissible that sex does nothing more than divide every existing character, including of course every latest variation among the individuals of a race.

The more one thinks over it, the more one concludes that the main use of sex is to produce uniformity, in that it produces likeness on a wide scale and unlikeness on a narrow one. Any benefit arising from the operation of sex would seem to lie in the stability of the organism which it produces, and the sociality which it promotes. How these results are obtained are difficult to explain; but the logical conclusion is that they are explicable by a halving in the offspring of every variation and character of every parent. With those conclusions, we leave it to our cynical friend, who asked what was the use of sex, to suggest an alternative procedure by which organic evolution could have reached its present stage. What bearing these reflections, if sound, have upon a present day socio-political question is left to the reader's critical judgment.

II.

Possibly many of the readers of this Journal have read Bergson's "Creative Evolution"; if they have not, then let them do so, for they will find it pregnant with literary charm, wide

knowledge and original thought. Few books have given one greater pleasure in recent years. The author takes up the idea of an evolution driven onward from within, little affected by natural selection, but impelled by an inward developmental force. In other words, we are made to conceive a primeval impulse which, starting with life itself, gathering impetus in its onward course, divides and expresses itself in the unceasing creation of endlessly varied forms. It is a fine idea, not perhaps altogether new, but still fascinating in its very unorthodoxy. In it occurs the following curious passage, discussing the nature of "instinct." The author is arguing from the wonderful procedure of the ammophila, or sand wasp, which, paralysing its caterpillar prey by stinging the nerve ganglia of the ventral chain, places it, and others similarly rendered immovable, as food for the grub that subsequently hatches from the ammophila's egg. The passage runs: "We suppose a sympathy, in the etymological sense of the word, between the ammophila and its victim, which teaches it from within, so to say, concerning the vulnerability of the caterpillar. This feeling of vulnerability might owe nothing to outward perception, but result from the mere presence together of the ammophila and the caterpillar, considered no longer as two organisms but as two activities" (p. 183 of 1911 edition).

Thinking over this passage, which is a remarkable one, and practically interpreting instinct as "sympathy," one has been reminded of certain difficulties associated with experience. An old view of instinct was one that described it as a lapsed intelligence; we need not discuss this, but confine ourselves to the idea of a sympathy. Just as I was reading Bergson's book, a pair of owls built their nest in the hollow of a ventilating tile on the roof of my bungalow. The tile was set at an angle, and in due course one owlet fell out on to an adjacent ledge. No one touched the fledgling, as one did not wish to scare the parent birds. Now, though that owlet lay wriggling conspicuously but a few inches from the aperture of the hollow in which the nest and other owlet were, the parent birds passed again and again over it, carrying food to the other nestling, without paying the unfortunate one the slightest attention. One watched the whole performance for hours, and, doing so, could not fail to draw the conclusion that in these birds the parental instinct had nothing which one could call sympathy about it, but rather was a blind impulse which took it, mechanically, to its nest, but all unconscious and unresponsive to the feeble cries of its own fledgling near by, but in a place where it was not expected to be. This incident, synchronizing with the pursual of Bergson's idea

of a sympathy, impressed one much. Take another case; there is a kind of wasp, very common in India, which feeds its larvæ with flies or small insects. One of these has been lately under observation. Now, if one scrapes the burrow and partially exposes the larvæ, the parent will cease feeding them, though it will come and hover round for a while. Here again there would seem to be nothing of the nature of sympathy, but only a blind obedience to some stimulus associated with the mouth of its burrow. In fact, in both the case of the bird and the wasp, the nest aperture seems to be the common source of stimulation, and to be essential to make them feed their young. That both the bird and wasp fail to feed their young under circumstances not in accord with their expectations or experiences may be due to a sense of fear, and that the sense of self-preservation for themselves is stronger than that which prompts them to preserve their progeny; this would seem particularly to be the case with the wasp, who scents danger when she finds her burrow disturbed. The case of the bird presents greater difficulty, and we can only assume that in this instance the altruistic character, on which we laid so much stress in the preceding note, is practically undeveloped in both female and male, at least for their young in the callow stage. A more charitable view is that the bird realizes that a fledging out of its nest, when so little developed, is impossible to save, no matter what the parents do, short of putting it back again. If this interpretation be near the truth, then we must concede to the bird a higher intelligence than we usually give to the family.

Returning to the passage quoted from Bergson, it is noticeable that he advances the conception of "a mere presence together," or the influence of another, resulting in a feeling of vulnerability of the caterpillar on the part of the sand wasp; this seems very difficult to reconcile with what one sees around one. Our everyday experience suggests that the commonest manifestation of protective instinct in an insect is anything but associated with any experience on its part with other living things. Among humans we truly speak of experience teaching and being a stern guide, but surely it is going too far to attach the experiences of an insect of other forms as any stage in its obtaining an intuitive insight into means of life preservation. The great need for an insect, as for all animals which cannot contend actively with their enemies, is to avoid all experience of them. It is not from the insects which have had the greatest experience of foes and the most chance of learning by contact with them the danger they mean, that the existing forms

of insects have evolved or descended. The present forms must surely be from those which have had the least experience. For instance, does an insect make a cocoon from any such teaching of experience? A chrysalis does not make its cocoon, and obviously could not have acquired any knowledge from experience to improve its species, and still less so of handing down that knowledge.

The argument is even stronger when we remember that a chrysalis, if detected by one of its natural foes, is deprived at once of any chance of continuing its species; therefore, no insect can obtain by any unconscious insight into life a gift of prophecy that will enable it to prepare, in advance, a means of protection against the attacks of hereditary enemies which it will never see itself, and which were never met by its own forbears. We must look elsewhere for the explanation, and regard the instinct which impels an insect to make a cocoon as nothing but the outcome of many generations of natural selection, during which the attacks of enemies have been successful or unsuccessful absolutely in accordance with the less or greater perfection of protective methods. In none of these cases can we see any instinctive sympathy or insight into relations with possible enemies rather than with probable friends. We are impelled to conclude that, in all these cases, the fact that the right enemies are prepared for in anticipation in the right way is explicable only by the hypothesis of natural selection, and that the hypothesis which explains this anticipatory protective ability suffices to explain evolution.

III.

The following reflections are suggested by a recent perusal of Reid's most interesting book, "The Laws of Heredity." The author comes to the general conclusion that evolution takes place by the action of natural selection on the small differences between parents and children, thereby ensuring the continuance of the more favourable variations. It follows from this that any unfavourable variation tends to be gradually eliminated; but the author argues that a further deduction is permissible, namely, that in human beings the bacterial diseases should eliminate those most susceptible to them, and that, since the more immune have the best chance of survival and of propagating their species, the effect of evolution must be that the immunity of a community exposed to a severe bacterial disease should gradually increase.

In formulating one's thoughts, raised by this book, one may

conveniently make the following premises. It will be admitted; (1) That none of us are so intimate with anything in living Nature as we are with our fellow human beings, and that in this case we are able, more than as to anything else, to depend upon our own observations. (2) That offspring differ in every observable mental and physical character from their parents. Many of these differences are acquired or due to differences in environment or nurture; they are in fact modifications. While other differences are germinal, innate or inborn; these are variations. (3) That the animal and plant worlds arose by evolution, with the result that the variations of an individual tend to be transmitted to his offspring and to remote generations. (4) That these variations are essentially germinal differences between parents and offspring.

Some difficulties arise as to what part these variations play in the scheme of evolution, and it is worth while thinking them over. If we ask ourselves what is a variation? we recognize that there are two kinds, namely, fluctuations and mutations. The former are innumerable, small differences normally distinguishing offspring from parents, and by the blending of the fluctuations a child results in being intermediate in type between its parents. A mutation, according to current literature, is a large variation or change of wide amplitude standing sharply distinct from the normal type, and neither blending nor fluctuating. According to Punnett, once it has arisen selection alone can eliminate it. If this be so, then mutations are the only source for permanent evolution; while fluctuations supply material only for transient changes. In other words, evolution by selection of mutations is a progression by a succession of rising or falling steps, and evolution by selection of fluctuations is a progression as up or down an inclined plane. It is obvious that we are here confronted with two diametrically opposed concepts, and the difficulty is to appraise them at their real values. The following line of thought suggests itself.

The daughter cells of a unicellular organism inherit the actual structures of their parent. On the other hand, a multicellular organism, derived from a single cell which is parasitic to the parent, inherits not the actual parental characters, but only the potentiality of producing them, and even every potential character is not necessarily developed. We know that male characters are passed on in a dormant condition through many generations of virgin female aphides, therefore we conclude that inheritance and reproduction are two distinct things and that, though there can be inheritance without reproduction of a character, there cannot be

reproduction without inheritance of that character. As some descendants develop one set of characters and some another, the question is closely associated with another problem, or that of—Do these facts indicate alternative inheritance or merely alternative dormancy or activity of the characters? Let us consider some of the evidence.

Some animal and many plant species are monœcious or hermaphroditic, but the greater number of plants and animals are diœcious; that is, the individuals develop the organs of only one sex. Between the monœcious and diœcious plants there are mixed types, in which the individual produces both hermaphrodite and unisexual flowers. We are here forced to ask ourselves, are the individuals of the diœcious species really unisexual, that is, the characters of the opposite sex are either absent altogether or those characters are potentially present, but merely undeveloped or dormant in the individual? If the former is the case, then a great gulf exists between male and female of the same species, even greater than between the males of one species and the males of another. This is tantamount to saying that a man is more divergent from a woman than he is from a stallion. Our own experiences tell us that this is absurd. If, on the other hand, male is but undeveloped female and vice versa, we can understand how monœcious and diœcious species are distributed through some lines of descent; and that males and females are merely differently developed individuals of the same type. The male and female characters are what one may call "stock variations." The evidence in support of this is diverse. We have referred already to the transmission of male characters through a long succession of virgin females in the aphides. Amongst humans the mammæ of men have become functionally active when used, and in certain perversions we know of human individuals developing the instincts of the opposite sex. In the lower world other instances of the same nature are known. Cocks, the offspring of very broody hens, when crossed with non-broody hens, tend to have broody female descendants; so also bulls, the offspring of generous milk-giving cows, tend to breed cows which yield much milk. These examples indicate the transmission of sexual characters of one sex in a dormant state through the other; further, though we are not justified in being dogmatic, we may suspect that every diœcious species is innately monœcious, and that there is not alternative inheritance of characters, but rather alternative dormancy or activity.

Similar in character is the evidence obtainable from cross-breeding of domestic animals and plants. When varieties that have been created by the selection of mutations are crossed, it is the rule for ancestral characters, dormant often for many years, to reappear. This probably explains the difficulty of raising many exceptional varieties of plants from seeds, and would seem to be due to a disturbance of dormancy by crossing. This general deduction needs qualification, however, according as to whether we are dealing with natural or artificial varieties. When natural varieties are crossed, the reappearance of lost ancestral characters is somewhat rare, but when artificial varieties are crossed the ancestral characters reappear in some abundance. The significance of this is great, and suggests a possible fundamental difference between artificial and natural selection, the former being founded on the selection of mutations and the latter on the selection of fluctuations.

The occurrence of dormancy of a character appears to happen only when a stock variation is added. We have already recognized maleness and femaleness to be stock variations, but stock variations in characters or features are known in other forms than the sexual. Thus the common berberis plant bears spines in a dry climate, but leaves in a moist one. Similarly the plant hippuris has a land and a water variety, which are convertible the one into the other, by changing the environment. In looking through Nature's material it is remarkable that among natural varieties of plants the stock variation of feature or character is generally one of some utility, whereas among artificial varieties the special stock variation of features are wanting in utility. Our knowledge of the finer details of the lives of plants and animals in a state of nature is too vague for us to indicate dogmatically the agencies or features which will result in the survival of the fittest or the elimination of the unfittest. The most we can do is to declare it to be highly probable that all living things present favourable and unfavourable variations to Nature, which tends to select the former for survival and the latter for elimination. Our chances of arriving at a sound conclusion are perhaps better if we consider the same question on the basis of humans, with every detail of whose lives we are familiar. It is interesting to see where this inquiry lands us.

Suppose we take the character of resistibility to disease, of which it may be laid down as an axiom that no man can survive unless he be resistant to the common diseases of the region in which he lives. Now the variations to which men differ in their disease-

resisting power are fluctuations, not mutations. In the case of every disease, we find all degrees of resisting power, from complete immunity to extreme susceptibility. We find no discontinuity as in a mutation, but only very fine continuous graduations. It is curious to note that no mutation of human beings favourable to evolution have been recorded. Most of us are familiar with human mutations, but they are all unfavourable. For example, club-feet, albinism, hæmophilia, hare-lip, idiocy and colour-blindness are typical mutations, and it is legitimate to question whether human evolution has been founded on such abrupt departures from the normal. Some parallel evidence is claimed to be furnished by such diseases as tuberculosis, measles and perhaps malaria, which all suggest that by virtue of evolution by selection of fluctuating variations, the various races of mankind are resistant to the bacterial diseases in proportion to their past experience of them. If this be true, then from this point of view we are forced to turn the scale in favour of evolution progressing by selection of fluctuations rather than by selection of mutations, and to say that fluctuations and characters which have arisen through the selection of fluctuations blend together; that the features or traits of natural species, including such diverse entities as colour, shape and susceptibility to disease, have arisen through the accumulation of fluctuations. Evolution on these lines is manifestly of a transitory kind, or that kind which is so transient that it enables species to change by adaptation to every change in environment, and yet, when preserved by selection, is sufficiently permanent as to keep useful features or characters stable through thousands of years. The situation is not, however, quite so simple as this would make it appear to be. There are some converse considerations.

The opposite view that evolution is dependent on the effect of natural selection on large variations or mutations is intimately bound up with the theory of Mendel. As regards human inheritance, one fails to see that the facts recorded are sufficiently numerous and definite to form a conclusion, either for or against the claims of this school. The real truth seems to be that if mutations can be proved to occur and persist in plants and animals, then they occur also in human beings, and the explanation on the Mendelian hypothesis of the facts derived from experimental breeding of plants and animals is also the explanation of many examples of heredity in man. We are bound to admit that there are some thirty-four recorded abnormalities in human beings where the condition is transmitted to subsequent generations in a manner

consonant with Mendel's laws, and the same is true of such normal conditions as red hair or colour of the eyes. In no case can the abnormalities be considered as being an advantage or even an adaptation to environment, while in some they suggest a definite disability. Yet, these conditions persist, and remarkable examples of this persistence of a disability through many generations are familiar to us in pseudo-hypertrophic paralysis and hæmophilia. One is impressed by the circumstances that both these affections are confined practically to the male, and that it is through the female, who is herself unaffected, that the transmission takes place, some of the sisters of the affected men passing the character to some of their sons. The children of the normal males of these families are always normal. One finds some difficulty in believing that this peculiarity is the outcome of natural selection on small variations or fluctuating differences. One needs to look elsewhere for the explanation of the continuance of these conditions; one finds a reasonable one in the fact that the females of colour-blind families and those of hæmophiliacs have a much larger number of children than is usual.

The question of blending of inherited qualities in the offspring is supposed to be the peculiar feature of small continuous variations, and gametic segregation that of mutations or large discontinuous variations. If this be a fact, then in the third generation of a Eurasian family we should expect to find segregation so shown by the production of a pure European and a pure Asian. One has looked into the histories of eleven families of this kind and in all cases the offspring of two half-breeds have been invariably a blend, but in one case where a further cross with a pure European occurred there was undoubted production of the white type in one child out of four; and in one other pedigree, where a half-breed mated with a pure Asian, three out of five children were pure Asian. These examples are insufficient for any dogmatism, either for blending or segregation; at most they emphasize the need for much accurate and extended observation, particularly among the progeny of two half-breeds. In this field, many of our Corps have great opportunities for accurate and systematic observation.

The generalization that the human race shows insusceptibility to the various bacterial diseases, according to their past experience of them, involves two assumptions — namely, that the known difference of individual resistance to infection by the various bacteria depends in each case upon the presence of a special hereditable quality, and that among races so exposed there is a

progressive improvement. The first assumption is far from established. Tuberculosis, measles, and malaria, are much quoted in support, but we have to remember that the resistance to tuberculosis is due to a different quality from those which fortify man against such diseases as measles or malaria; and because tuberculosis may be inherited, it does not follow that the other two are also hereditable. We know too little about natural immunity to say that resistance to one infection is due to the possession of a quality similar to that which causes insusceptibility to another; it is possible that is so, but acquired immunity differs much in nature and duration according to the special micro-organism concerned. An attack of measles gives usually a lifelong immunity, but in cholera and pneumonia the duration of immunity is very short. The insusceptibility to measles and malaria undoubtedly differs in individuals, but any racial differences may have been acquired in quite different ways. One is disposed to question the existence of any racial difference as to malaria susceptibility, but even granting it to exist that difference may be due to the circumstance that the races inhabiting malarious areas have all their very susceptible members eliminated in young life, while the surviving adults are the specially resistant ones, whose resistance has been increased by repeated attacks of the disease. One's own observations indicate that all races are equally susceptible to malarial infection in childhood, and that there is no real evidence to warrant the view that any insusceptibility to malaria is either an inherited quality or dependent on racial differences due to evolution.

The idea that there is a progressive evolution of insusceptibility by the action of natural selection, when a race is exposed to a bacterial infection, appears to be weak. The evidence is perhaps strongest as to tuberculosis, but there are not wanting those who deny that susceptibility to this disease is inherited. Suppose we admit that it is inherited, we find on the first general exposure of a race to the tuberculosis infection, a high attack rate, and a high case mortality and the succeeding generations show an improvement in these respects; but there comes a time when the improvement stops, and the evidence as to any continual progress is no stronger than that in favour of the view that the improvement has reached high-water mark. In fact, as to this question we find a stalemate. The truth seems to be that any present progress with respect to susceptibility to tubercle in human beings, turns not on any evolution process but can be accounted for by lessened

exposure and improved environment. The case for the action of selection needs very careful advocacy, and any advances claimed among human races, *qua* susceptibility to infection by the bacterial diseases, are no more different than the advance that has been made in the speed of race-horses by artificial selection. It is an open secret that, in spite of stringent selection, there has been no increase of speed in race-horses for a hundred years. All that has occurred is an advance to a certain point, and since that was reached no further progress.

Reviewing the position as a whole we arrive at this conclusion, that evidence from the human species is quite insufficient for the proof of any theory of evolution. Its disadvantages as compared with plants and animals are obvious. Among the latter selection, whether natural or artificial, acting on fluctuations or small variations, undoubtedly causes a rapid improvement, since these variations are hereditable and fluctuate round a mean. Selection eliminates lower forms, so that there is an advance in the average, but the normal upper range of variations remains the same and progress soon ceases directly selection stops. The moment selection ceases to act there is a rapid return to the previous normal condition. Strictly speaking, exact evidence of progress is the only true test of evolution, and if evolution be by the action of natural selection on fluctuating or small variations only, we find real evidence of progress to be defective; on the other hand, this criterion of evolution is not unequivocally supplied by the selection only of large discontinuous variations. The truth lies probably between the two, or rather, that both schemes of selection are in operation in nature. This suggests that the heated controversies between the two schools of thought are energy misdirected, and that science would profit more if the exposition of facts were less burdened with doctrines, whose claim to be labelled as scientific truths needs the cold scrutiny of the future as well as the enthusiasm of the present.

MORPHOLOGY OF VARIOUS STRAINS OF THE TRYPANOSOME CAUSING DISEASE IN MAN IN NYASALAND. I.—THE HUMAN STRAIN.[1]

By Surgeon-General Sir DAVID BRUCE, C.B., F.R.S.; Majors DAVID HARVEY and A. E. HAMERTON, D.S.O., R.A.M.C.; and Lady BRUCE, R.R.C.

Introduction.

In order to gain a general idea of this important species of trypanosome, it will be necessary to study as many individual strains as possible. It may be thought unnecessary to describe each strain so much in detail, but without this it will be impossible to get any order out of the chaos which rules at present in the classification of the African species of trypanosomes pathogenic to man and the domestic animals.

Up to the present the Commission have only had an opportunity of working with five human strains. Four of these are from natives infected in the sleeping-sickness area, Nyasaland, the fifth from a European who contracted the disease in Portuguese East Africa. It is intended, in later papers, to describe five strains from wild game and the same number from the tsetse fly, *Glossina morsitans*.

The human strains are named: I, Mkanyanga; II, E——; III, Chituluka; IV, Chipochola; and V, Chibibi.

I.—Morphology of Strain I, Mkanyanga.

This has already been dealt with in a previous paper.[2]

II.—Morphology of Strain II, E——.

The following table gives the average length of this trypanosome as found in goats, sheep, monkeys, dogs and rats, 1,500 trypanosomes in all, and also the length of the longest and shortest :—

Table I.—Measurements of the Length of the Trypanosome of Strain II., E——.

Date	Method of Fixing	Method of Staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	22·2	36·0	15·0

[1] Reprinted from the *Proceedings of the Royal Society*, B, vol lxxxvi.

[2] *Proc. Roy. Soc.*, 1912, B, vol. lxxxv, p. 423.

The average length of the trypanosome of Strain II, in different species of animals, is as follows :—

TABLE II.

Species of animal	Number of trypanosomes measured	In microns		
		Average length	Maximum length	Minimum length
Goat	60	20·7	34·0	15·0
Sheep	20	21·3	28·0	18·0
Monkey	160	22·9	36·0	17·0
Dog	260	21·8	31·0	17·0
Rat	1000	23·1	32·0	17·0

TABLE III.—DISTRIBUTION IN RESPECT TO LENGTH OF 1,500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN II, E——.

	In microns										
	15	16	17	18	19	20	21	22	23	24	25
Total	2	2	12	55	108	159	210	188	215	177	138
Percentage ..	0·2	0·2	0·9	3·0	7·2	10·6	14·0	12·6	14·4	11·8	9·2

	In microns										
	26	27	28	29	30	31	32	33	34	35	36
Total	83	60	34	26	18	8	3	—	1	—	1
Percentage ..	5·6	4·0	2·3	1·8	1·2	0·6	0·2	—	0·1	—	0·1

This curve is made up of measurements from 60 specimens of trypanosomes taken from the goat, 20 from the sheep, 160 from the monkey, 260 from the dog, and 1,000 from the rat.

In a previous paper it was suggested that 1,000 trypanosomes taken at random would be a suitable number to plot a curve from, for purposes of comparison. This is done in Chart 2.

The taking away of 500 rat trypanosomes has changed, to a great extent, the character of the curve. There is no resemblance between this curve and that given on Chart 1 of Strain I, Mkanyanga.

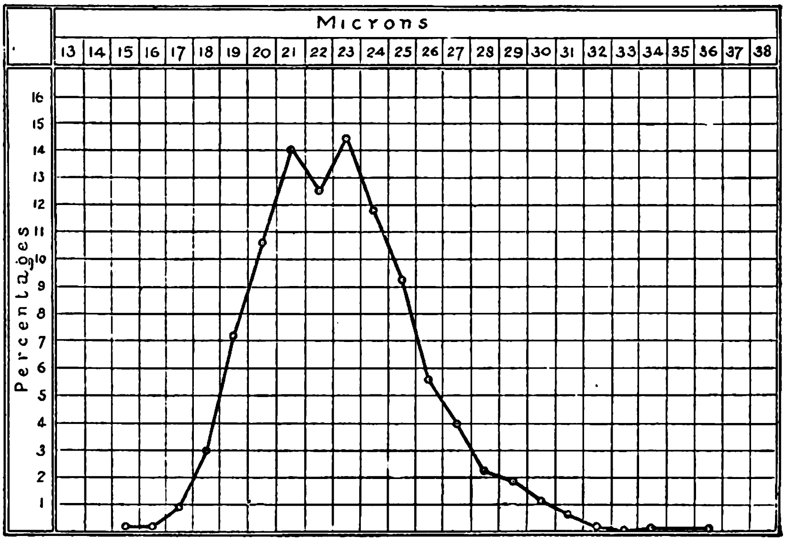


CHART 1.—Curve representing the distribution, by percentages, in respect to length, of 1,500 individuals of the Trypanosome of Strain II, E——.

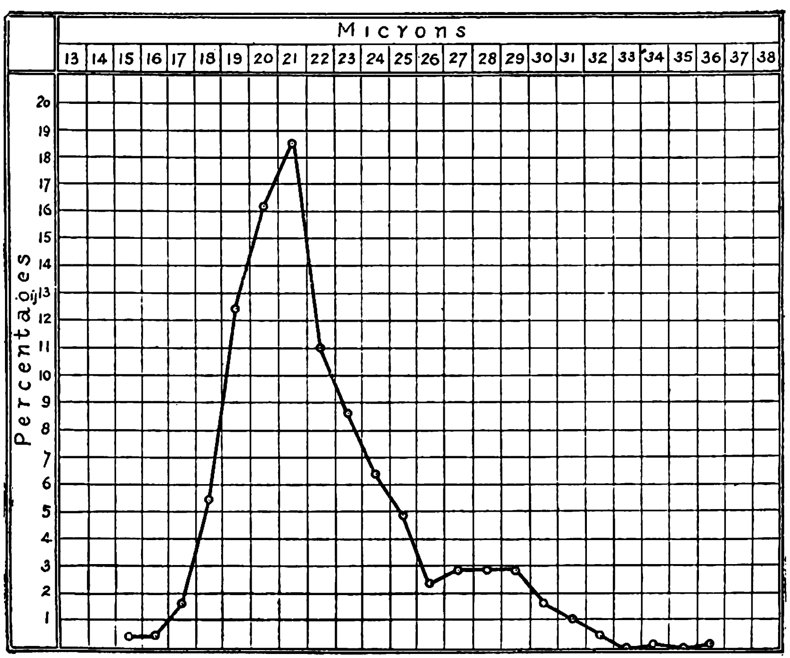


CHART 2.—Curve representing the distribution, by percentages, in respect to length, of 1,000 individuals of the trypanosome of Strain II, E——.

If the two strains, I and II, belong to the same species, then little help can be expected from this system of measurement in classifying trypanosomes.

It has been suggested by Dr. J. W. W. Stephens that the measurements should be made from one animal, and he proposed the tame rat as a suitable species. There seems much to be said in favour of this. Practically, his proposal is that a series of slides should be made with blood taken on ten consecutive days from a single rat, and that 100 trypanosomes should be drawn each day. But it is no light task to draw 1,000 trypanosomes at a magnification of 2,000, and afterwards to measure them. We have therefore made a compromise and measure 60 trypanosomes on nine consecutive days, beginning from the day the parasites first appear in the blood. In order to deal with a round number (500) only 20 are measured on the ninth day.

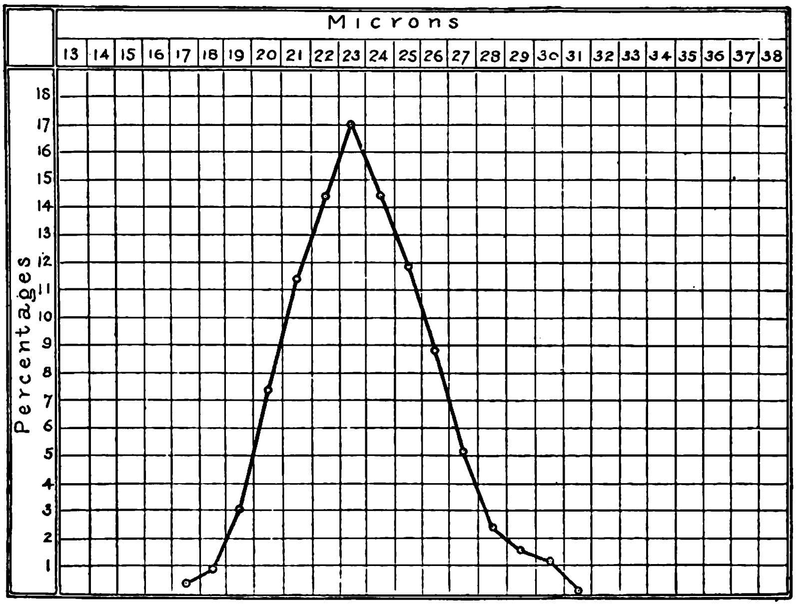


CHART 3.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain II, E——, taken on nine consecutive days from Rat 728.

This makes a symmetrical curve, which ascends and descends by fairly regular steps, but with little likeness to Charts 1 and 2.

In an organism low in the scale of nature, such as this, subject to great variation in form, it might be thought that it would not

be likely to behave in any two rats in the same way. The following chart shows that this is not so, but that, on the contrary, the same strain of trypanosome planted in two different animals of the same species grows in a remarkably similar way.

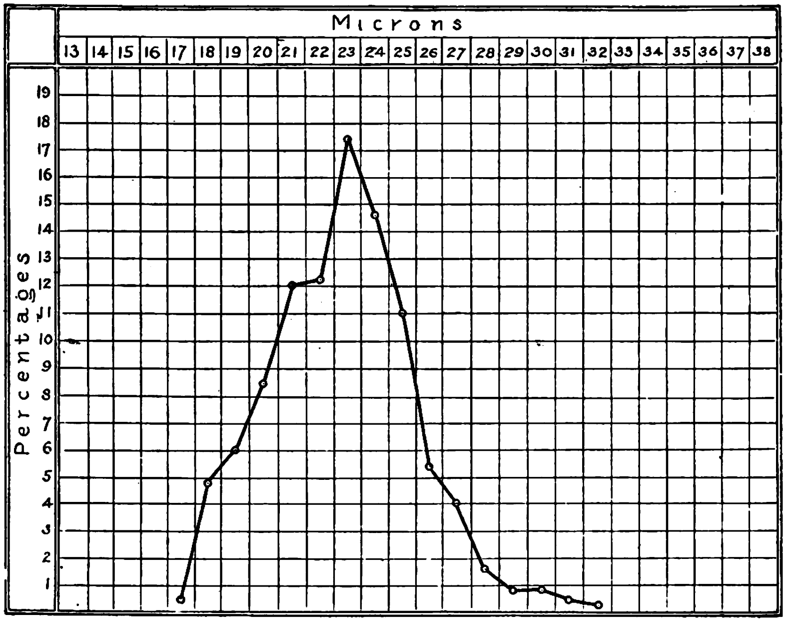


CHART 4.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain II, E——, taken on nine consecutive days from Rat 726.

It is remarkable how much alike these last two curves are. If curves made in this way from different strains of one species of trypanosome showed the same degree of similarity, this method would certainly be useful for purposes of classification. But, as we have seen, the curve of Strain II has no resemblance to that of Strain I, and it will be found that each human strain of this species of trypanosome differs, more or less, when subjected to this method of measurement.

As the occurrence of posterior-nuclear forms has been made the distinguishing character between *Trypanosoma brucei, gambiense*, and *rhodesiense*, it will be of interest to note the percentage of these forms in the various strains. The method used is to count the number of posterior nuclears in 1,000 short and stumpy forms in ten specimens of a single rat's blood taken, as near as possible, on ten consecutive days.

TABLE IV.—PERCENTAGE OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN II, E——

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912.			
June 25	728	Rat	10
,, 26	728	,,	17
,, 27	728	,,	3
,, 29	728	,,	9
July 1	728	,,	5
,, 2	728	,,	5
,, 3	728	,,	9
,, 4	728	,,	3
,, 5	728	,,	18
,, 6	728	,,	14
		Average ..	9·3

In regard to breadth, shape, contents of cell, nucleus, micronucleus, undulating membrane and flagellum, it is not proposed to describe these characters separately for each strain, as was done in Strain I. Suffice it to say that no difference can be made out in regard to these particulars on comparing the five strains. The same posterior-nuclear and blunt-ended forms are present in all.

III.—MORPHOLOGY OF STRAIN III, CHITULUKA.

The following table gives the average length of this trypanosome as found in the goat, monkey, dog and rat, 1,500 trypanosomes in all, and also the length of the longest and shortest :—

TABLE V.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN III, CHITULUKA.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	26·1	38·0	15·0

The average length of the trypanosome of Strain III, in different species of animals, is as follows :—

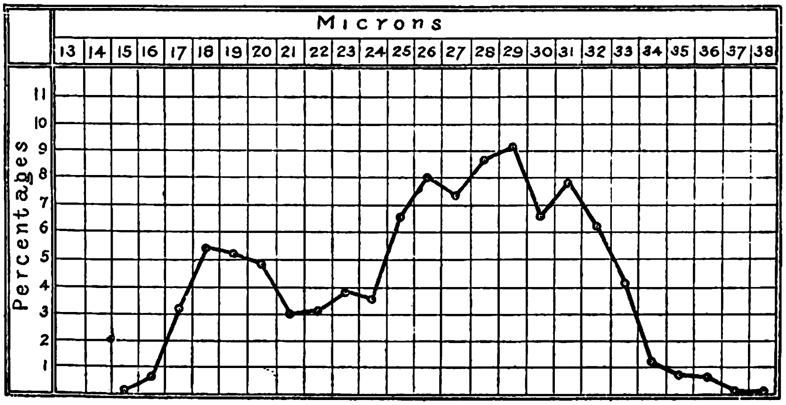
TABLE VI.

Species of animal	Number of trypanosomes measured	In microns		
		Average length	Maximum length	Minimum length
Goat	80	26·9	32·0	16·0
Monkey	160	27·7	36·0	16·0
Dog	260	24·1	35·0	16·0
Rat	1000	26·4	38·0	15·0

TABLE VII.—DISTRIBUTION IN RESPECT TO LENGTH OF 1,500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN III, CHITULUKA.

	In microns											
	15	16	17	18	19	20	21	22	23	24	25	26
Total ..	1	8	48	81	78	71	44	46	56	53	98	120
Percentage	0·1	0·6	3·2	5·4	5·2	4·8	3·0	3·1	3·8	3·6	6·6	8·0

	In microns											
	27	28	29	30	31	32	33	34	35	36	37	38
Total ..	111	128	138	99	117	91	63	27	11	9	1	1
Percentage	7·4	8·6	9·2	6·6	7·8	6·2	4·2	1·1	0·7	0·6	0·1	0·1



CHAR 5.—Curve representing the distribution, by percentages, in respect to length, of 1,500 individuals of the trypanosome of Strain III, Chituluka.

This curve is made up of measurements from 80 specimens of trypanosomes taken from the goat, 160 from the monkey, 260 from the dog, and 1,000 from the rat. It resembles that of Strain I, and differs absolutely from Strain II.

As in the case of Strain II, E——, a curve is also given of 1,000 individuals of this strain.

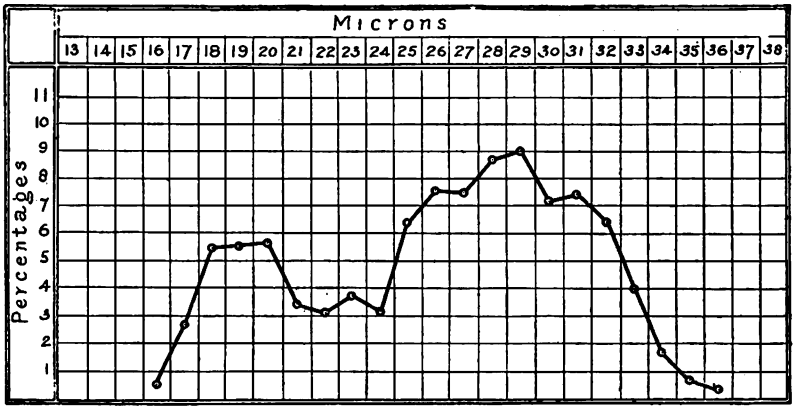


CHART 6.—Curve representing the distribution, by percentages, in respect to length, of 1,000 individuals of the trypanosome of Strain III, Chituluka.

This curve, made up of 1,000 individuals, is very similar to the previous one of 1,500. It is made up of 80 specimens of trypanosomes taken from the goat, 160 from the monkey, 260 from the dog, and 500 from the rat.

The two following curves represent measurements of 500 trypanosomes taken from each of two rats.

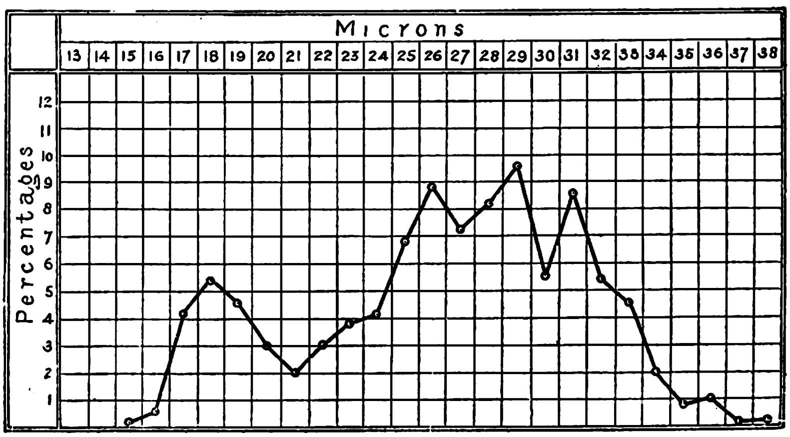


CHART 7.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain III, Chituluka, taken on nine consecutive days from Rat 952.

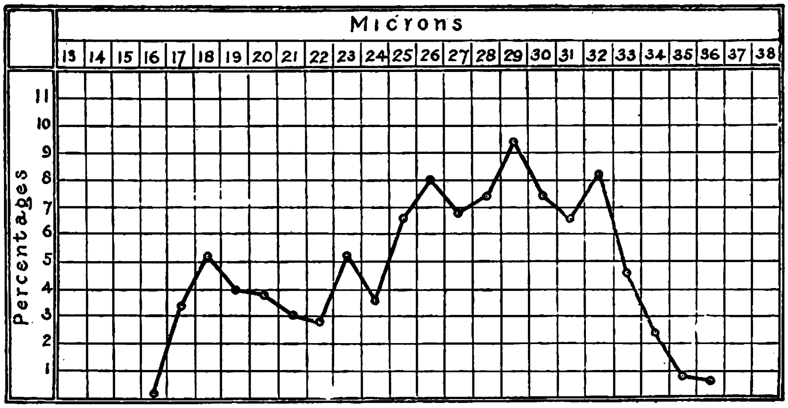


CHART 8.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain III, Chituluka, taken on nine consecutive days from Rat 953.

These last two curves from different rats also closely resemble each other. It is curious and striking that the same strain of trypanosome growing in two different animals should show this remarkable similarity.

TABLE VIII.—PERCENTAGE OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN III, CHITULUKA.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912.			
August 2	953	Rat	4
,, 3	953	,,	6
,, 6	953	,,	3
,, 7	953	,,	8
,, 8	953	,,	6
,, 9	953	,,	13
,, 10	953	,,	32
		Average ..	10·3

IV.—MORPHOLOGY OF STRAIN IV, CHIPOCHOLA.

The following table gives the average length of this trypanosome as found in goats, monkeys, dogs and rats, 1,000 trypanosomes in all, and also the length of the longest and shortest:—

TABLE IX.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN IV, CHIPOCHOLA.

Date	Method of Fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	22·5	34·0	15·0

The average length of the trypanosome of Strain IV, in different species of animals, is as follows :—

TABLE X.

Species of animal	Number of trypanosomes measured	In microns		
		Average length	Maximum length	Minimum length
Goat	80	20·4	29·0	15·0
Monkey	160	22·0	34·0	16·0
Dog	260	20·9	31·0	15·0
Rat	500	22·5	34·0	15·0

TABLE XI.—DISTRIBUTION IN RESPECT TO LENGTH OF 1,000 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN IV, CHIPOCHOLA.

	In microns									
	15	16	17	18	19	20	21	22	23	24
Total	2	4	32	68	110	101	109	106	95	95
Percentage	9·2	0·4	3·2	6·8	11·0	10·1	10·9	10·6	9·5	9·5

	In microns									
	25	26	27	28	29	30	31	32	33	34
Total	74	64	50	38	26	16	5	3	1	1
Percentage	7·4	6·4	5·0	3·8	2·6	1·6	0·5	0·3	0·1	0·1

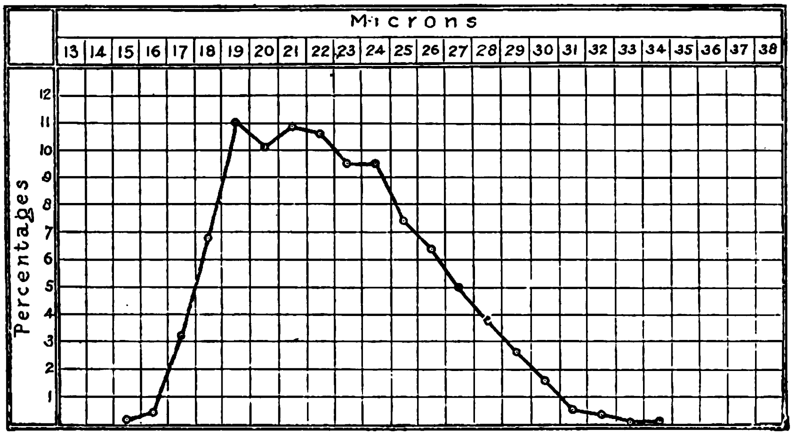


CHART 9.—Curve representing the distribution, by percentages, in respect to length, of 1,000 individuals of the trypanosome of Strain II, Chipochola.

This curve is made up of 80 specimens of trypanosomes taken from the goat, 160 from the monkey, 260 from the dog, and 500 from the rat.

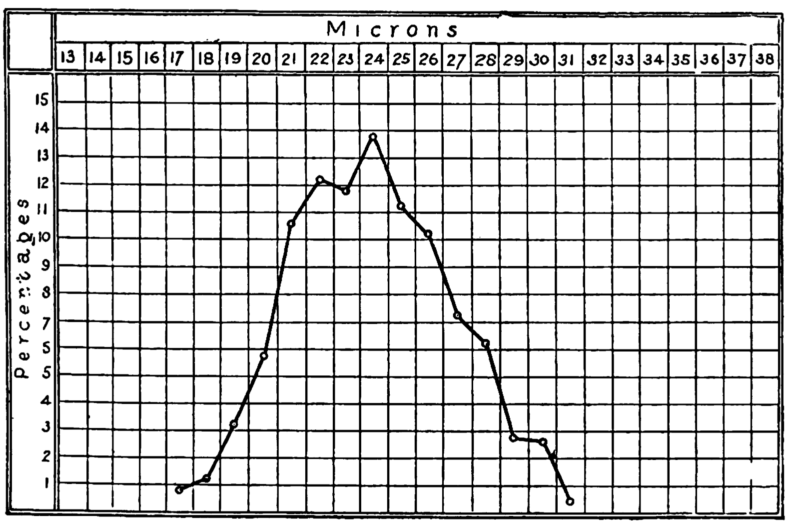


CHART 10.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain IV, Chipochola, taken on nine consecutive days from Rat 1337.

TABLE XII.—PERCENTAGE OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN IV, CHIPOCHOLA.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912.			
Sept. 20	1337	Rat	1
,, 23	1337	,,	1
,, 24	1337	,,	2
,, 25	1337	,,	4
,, 26	1337	,,	0
,, 28	1337	,,	0
,, 29	1337	,,	1
,, 30	1337	,,	14
Oct. 1	1337	,,	5
,, 2	1337	,,	5
		Average ..	3·3

V.—MORPHOLOGY OF STRAIN V, CHIBIBI.

The following table gives the average length of this trypanosome as found in goats, monkeys, dogs and rats, 1,000 in all, and also the length of the longest and shortest :—

TABLE XIII.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN V, CHIBIBI.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	22·4	37·0	15·0

The average length of the trypanosome of Strain V, in different species of animals, is as follows :—

TABLE XIV.

Species of animal	Number of trypanosomes measured	In microns		
		Average length	Maximum length	Minimum length
Goat	80	19·9	31·0	16·0
Monkey	160	21·8	32·0	15·0
Dog	260	20·6	37·0	16·0
Rat	500	24·0	32·0	18·0

TABLE XV.—DISTRIBUTION IN RESPECT TO LENGTH OF 1,000 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN V, CHIBIBI.

	In microns										
	15	16	17	18	19	20	21	22	23	24	25
Total	1	8	20	58	117	122	123	107	93	93	63
Percentage	0·1	0·8	2·0	5·8	11·7	12·2	12·3	10·7	9·3	9·3	6·3

	In microns											
	26	27	28	29	30	31	32	33	34	35	36	37
Total	51	41	43	30	16	10	3	—	—	—	—	1
Percentage	5·1	4·1	4·3	3·0	1·6	1·0	0·3	—	—	—	—	0·1

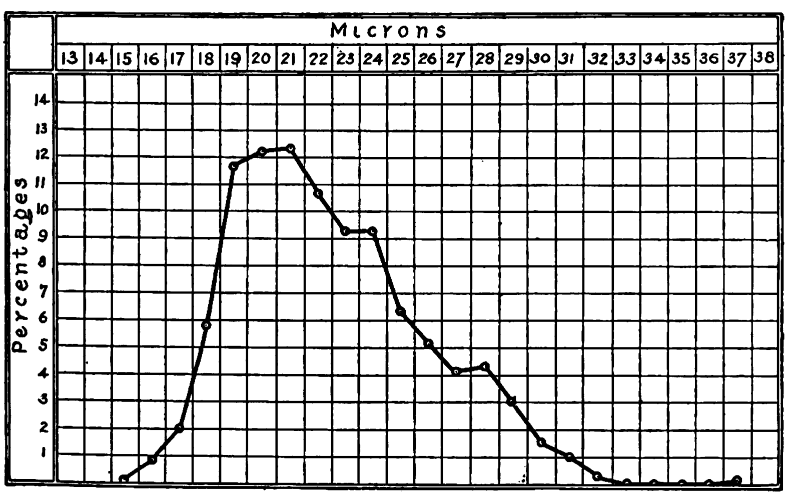


CHART 11.—Curve representing the distribution, by percentages, in respect to length, of 1,000 individuals of the trypanosome of Strain V, Chibibi.

This curve is made up of 80 specimens of trypanosomes taken from the goat, 160 from the monkey, 260 from the dog, and 500 from the rat.

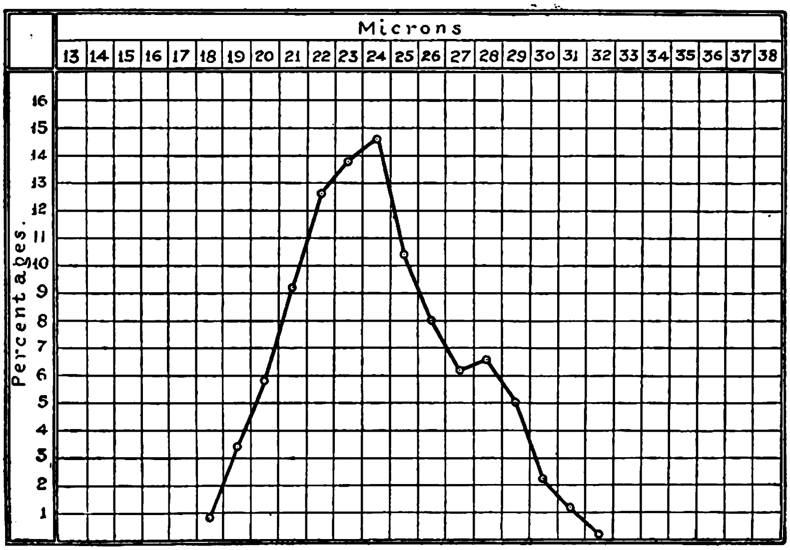


CHART 12.—Curve representing the distribution, by percentages, in respect to length, of 500 individuals of the trypanosome of Strain V, Chibibi, taken on nine consecutive days from Rat 1660.

TABLE XVI.—PERCENTAGE OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN V, CHIBIBI.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912.			
Dec. 3	1660	Rat	0
,, 4	1660	,,	34
,, 5	1660	,,	2
,, 8	1660	,,	6
,, 9	1660	,,	8
,, 10	1660	,,	23
,, 11	1660	,,	31
,, 12	1660	,,	28
,, 13	1660	,,	27
,, 14	1660	,,	32
		Average	21·1

COMPARISON OF THE HUMAN STRAINS.

The following table gives the average length of this trypanosome in the five human strains under consideration, as found in goats,

sheep, monkeys, dogs and rats, 6,200 trypanosomes in all, and also the length of the longest and shortest :—

TABLE XVII.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOMES OF THE FIVE HUMAN STRAINS. THE TRYPANOSOMES HAVE BEEN TAKEN FROM VARIOUS ANIMALS.

Date	Strain	Name	Number of trypanosomes	Animals	In microns		
					Average length	Maximum length	Minimum length
1912	I	Mkanyanga	1220	Various	24·1	36·0	14·0
1912	II	E——	1500	,,	22·2	36·0	15·0
1912	III	Chituluka	1500	,,	26·1	38·0	15·0
1912	IV	Chipochola	1000	,,	22·5	34·0	15·0
1912	V	Chibibi	1000	,,	22·4	37·0	15·0
			6220		23·5	38·0	14·0

It must be acknowledged that, in spite of the fairly large number of trypanosomes measured, there is a marked difference in the average length of the five human strains—from 22·2 to 26·1 microns. Strains II, IV and V are similar, varying only from 22·2 to 22·5.

This difference in average length may be due to slight variations having taken place in the different strains, resulting from the passage through more or less resistant man. There is no evidence that this variation is due to treatment by atoxyl or other drugs. It has been shown that the same strain grown in two animals of the same species gives like results.

TABLE XVIII.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOMES OF THE FIVE HUMAN STRAINS. THE TRYPANOSOMES HAVE BEEN TAKEN FROM THE RAT ALONE.

Date	Strain	Name	Number of trypanosomes	Animal	In microns		
					Average length	Maximum length	Minimum length
1912	I	Mkanyanga	600	Rat	25·1	35·0	16·0
1912	II	E——	1000	,,	23·1	32·0	17·0
1912	III	Chituluka	1000	,,	26·4	38·0	15·0
1912	IV	Chipochola	500	,,	22·5	34·0	15·0
1912	V	Chibibi	500	,,	24·0	32·0	18·0
			3600		24·2	38·0	15·0

COMPARISON OF THE CURVES FROM THE FIVE HUMAN STRAINS.

It must also be confessed that, on comparing the five curves one with another, they do not give as much assistance in classifying this species of trypanosome as was hoped. Curves I and III are alike, and coincide with that prepared by Dr. Stephens from the case of Armstrong in Liverpool, whereas Curves II, IV and V approach more to the type described by Kinghorn and Yorke from the Luangwa Valley.

TABLE XIX.—DISTRIBUTION IN RESPECT TO LENGTH OF 6,220 INDIVIDUALS OF THE FIVE HUMAN STRAINS. THE TRYPANOSOMES HAVE BEEN TAKEN AT RANDOM FROM VARIOUS ANIMALS.

	In microns											
	14	15	16	17	18	19	20	21	22	23	24	25
Strains I-V ..	1	10	41	154	325	494	528	577	512	525	511	464
Percentage ..	—	0·2	0·7	2·5	5·3	8·0	8·4	9·3	8·3	8·4	8·3	7·5

	In microns												
	26	27	28	29	30	31	32	33	34	35	36	37	38
Strains I-V	425	372	347	307	198	167	123	77	36	12	11	2	1
Percentage ..	6.8	6·0	5·6	4·9	3·1	2·7	2·0	1·0	0·6	0·2	0·2	—	—

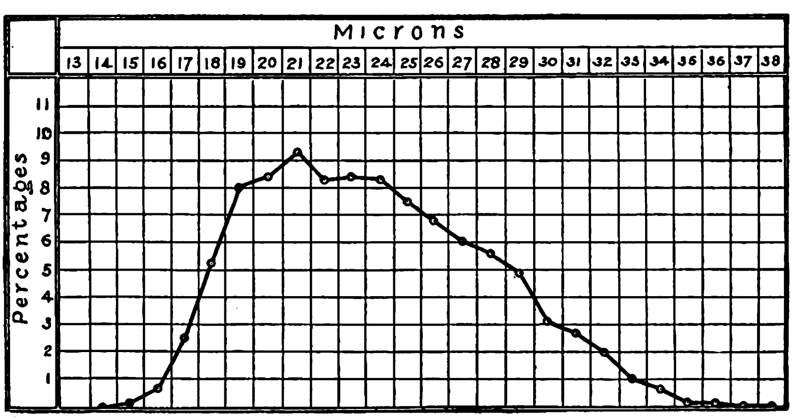


CHART 13.—Curve representing the distribution, by percentages, in respect to length, of 6,220 individuals of the human strain of the trypanosome causing disease in man in Nyasaland. The trypanosomes have been taken from various animals.

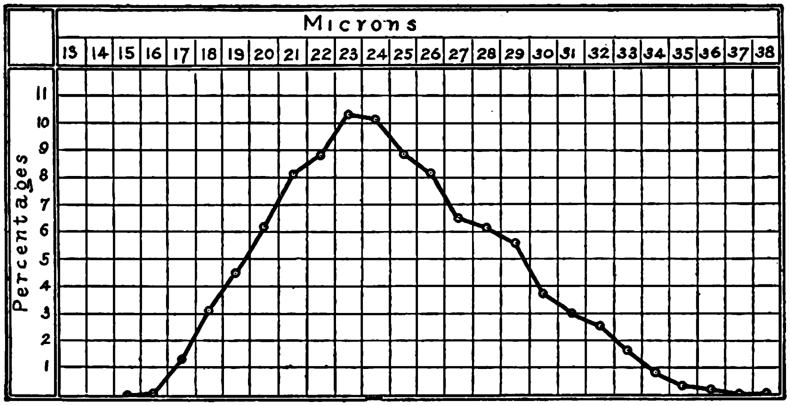


CHART 14.—Curve representing the distribution, by percentages, in respect to length, of 3,600 individuals of the human strain of the trypanosome causing disease in man in Nyasaland, taken from the rat alone.

Curves 13 and 14 will be found of use when the human strain of this species of trypanosome is compared with the wild game and the wild *Glossina morsitans* strains.

TABLE XX. — COMPARISON OF THE PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF THE HUMAN STRAIN.

Experiment No.	Strain	Name	Animal	Percentage among short and stumpy forms
—	I	Mkanyanga	Rat	34·1
728	II	E——	,,	9·3
953	III	Chituluka	,,	10·3
1337	IV	Chipochola	,,	3·3
1660	V	Chibibi	,,	32·0
			Average ..	17·8

It is to be noted that in the human strain the percentage of posterior-nuclear forms varies greatly, although the method of enumeration is the same in each case. This presence of posterior-nuclear forms would have been accepted a few months ago as sufficient proof that the species dealt with was *T. rhodesiense*. Since then posterior-nuclear forms have been reported as occurring

in *T. brucei* from Egypt, Uganda and Zululand. In a strain lately obtained by Theiler from the same spot in Zululand where this species was originally discovered in 1894, this percentage rose to the highest yet recorded.

Conclusions.

(1) The five human strains of this trypanosome, isolated from four natives in Nyasaland and one European in Portuguese East Africa, belong to the same species.

(2) This species is *T. rhodesiense* (Stephens and Fantham).

(3) Evidence is accumulating that *T. rhodesiense* and *T. brucei* (Plimmer and Bradford) are identical.

NOTES ON AN EPIDEMIC OF GERMAN MEASLES.

By Major J. G. McNaught.
Royal Army Medical Corps.

The following notes are founded upon the observation of over 200 cases of German measles, occurring among the garrison of the Aldershot Command during the months of February, March, April, May and June, 1913. Although this disease is of a comparatively trivial nature, it causes a good deal of inconvenience, owing to its extreme infectiousness among young adults, and is frequently somewhat difficult to differentiate from measles and, more rarely, from scarlet fever. The descriptions found in text-books vary very much, and are seldom satisfactory. I found, however, the account of the disease given in Dr. C. B. Ker's "Practical Text-book of Infectious Diseases" extremely helpful.

As the essential point in dealing with this affection is to make an accurate diagnosis, the object of this short paper is to give some assistance in making a differential diagnosis. As both measles and German measles were prevalent at the same time in the same units of the Aldershot garrison, this was not always an easy matter.

Invasion Period.—As a general rule the patients had felt out of sorts for one or two days before the appearance of the rash. The usual complaint was of pains in the limbs, slight headache and slight sore throat. A few complained of stiff neck, and a considerable number volunteered the information that they had noticed the glands of the neck enlarged. Many stated they thought they had caught a slight cold, but catarrh was never a prominent symptom. In a considerable number of cases the first thing that made the patients think there was something the matter with them was the appearance of the rash.

Rash.—The appearance of the rash varied considerably according to the stage at which the patient came under observation. If seen early, the rash consisted of rose-pink papules, first appearing on the face, the upper part of the chest and neck, and spreading over the body and limbs. Sometimes the rash remained papular till it faded, but frequently it became a diffuse, smooth erythema, not unlike the rash of scarlet fever. Even when the rash had become erythematous on the trunk and thighs, a papular rash was still to be found on the legs and feet. Itching was not complained of. The rash remained visible for two or three days. In a few cases a slight branny desquamation was noticed on the face and neck, but I never noticed any desquamation elsewhere.

Temperature.—In most cases there was a slight rise of temperature, not exceeding 101° F., and lasting only for one or two days. In a large number of cases, especially towards the end of the epidemic, the temperature was normal throughout. In two cases the temperature reached 104° F., and in two cases, 103° F. The patient's general condition in these cases was good, he did not look at all ill, and said he felt well. In ten cases the temperature reached 102° F.

Glandular Enlargement.—The posterior cervical glands were found more or less enlarged in all the cases. In a few cases the posterior auricular and sub-mental glands were enlarged. In two cases the posterior cervical, posterior auricular, sub-mental, axillary, and inguinal glands were all enlarged. Many of the patients stated that the cervical glands became enlarged before the rash came out. The enlargement was painless, or practically so, as most patients had not noticed it until pointed out to them.

Eye Symptoms.—There was no swelling of the eyelids, mucopurulent secretion, or pronounced redness, but a pink appearance of the conjunctiva was a characteristic sign.

Tongue.—The tongue was often normal in appearance. Sometimes it was coated with a thin white fur, but it was never thickly coated, nor was the breath offensive. In this respect there was a marked difference between cases of German measles and measles, a very dirty tongue and an offensive smell from the breath being usually present in measles.

Buccal Mucous Membrane and Throat.—The soft palate was usually congested, showing patches of a brick-red colour, and the fauces slightly red, but the buccal mucous membrane generally was normal in appearance as a rule, in exceptional cases it showed slight pinkish congestion, but never the dark red or purplish hue commonly seen in measles. Koplik's spots were never seen, though every case was carefully examined for them. All cases in which Koplik's spots were detected turned out to be cases of measles.

Complications.—There were no complications. After a couple of days the patients felt quite well, had recovered their appetite, and wished to be up.

Diagnosis.—The chief difficulty in diagnosis consists in the confusion between this disease and measles. A case seen in the early stage is often difficult to distinguish from a mild case of measles, and a large number of cases sent to hospital as measles turned out to be German measles. In a smaller number of cases the opposite mistake was made, cases of measles being sent in as German measles.

The chief points to be attended to in forming a diagnosis between measles and German measles are the following: German measles is a much milder disease than measles. The patient does not look ill, the preliminary symptoms are slight, and even if the temperature is high, the general condition is in contrast to the amount of fever. The catarrh in measles is much more severe, the eyelids are swollen, and the conjunctivæ of the lids deeply congested. The glandular enlargement is constantly present in German measles, and only occasionally in measles. The buccal mucous membrane is more congested, and of a darker colour in measles than in German measles. Koplik's spots are never found in German measles. This is a most important sign, and is especially useful when a mild case of measles comes under observation just as the rash is beginning to appear. These are the cases that are readily mistaken for German measles; but if Koplik spots are found, the case may be at once diagnosed as measles. Though the early rash of measles may be difficult to distinguish from the rose rash of German measles, it soon becomes darker in colour, and shows a bluish-red, or purplish, tint which the rash of German measles never assumes. The diagnosis of German measles from scarlet fever should seldom give rise to difficulty, though if a case of German measles be not seen until it has reached the stage where the rash has become erythematous, it may be mistaken for a mild case of scarlet fever. If the whole body be stripped and carefully examined, it will be found that in the case of German measles a rose-red papular rash can still be seen on the lower parts of the limbs, even when the rash on the trunk has become erythematous—the erythematous rash of German measles is smooth, not punctate. Other points of difference are that in German measles the "pink-eye" appearance is characteristic; there is no circum-oral pallor, the congestion of the fauces is less definite than in scarlet fever, and the tongue is normal, or only very slightly coated, and no prominent papillæ are seen.

Two cases of scarlet fever and two of urticaria were sent in as German measles.

Evidence that German Measles is a Distinct Disease.

The specificity of German measles is now generally accepted; but the following cases are of interest in showing that German measles confers no protection against measles or scarlet fever, and vice versa. I may mention that out of 163 cases of German measles in which special inquiry was made on this point, 100 had previously suffered from measles.

Driver G., A.S.C., was admitted to hospital on January 4, 1913, suffering from a severe attack of measles. He recovered, and went back to duty. On April 3, he was readmitted to hospital suffering from German measles.

In the following two cases measles and German measles developed concurrently:—

Private K., Hampshire Regiment, was admitted to hospital on April 8, 1913, suffering from German measles. On April 13, while convalescent from German measles, he developed a very severe attack of measles, complicated with broncho-pneumonia.

Gunner M., R.F.A., was admitted to hospital with measles on April 18, 1913, and developed German measles on April 22.

In the following cases the patients appear to have exchanged diseases. They were acquaintances belonging to the same unit, and subsequent investigation showed that they had, contrary to orders, had communication with each other in the hospital grounds:—

Driver Lt., A.S.C., was admitted to hospital with German measles on March 24, 1913, and developed scarlet fever on March 31.

Driver Lr., A.S.C., was admitted to hospital with scarlet fever on March 10, 1913, and developed German measles on April 4.

Necessity for Isolation and Disinfection.—German measles, as it presented itself in this epidemic, is such a trivial affection that the question suggests itself whether it is worth while to isolate and disinfect. The disease is undoubtedly very infectious in its early stages, though I doubt very much if the infectivity persists after the acute stage is over. I am not aware of any evidence that infection is conveyed by fomites, and I doubt very much if the disinfection of bedding and clothing is necessary.

I find it stated under the heading "Rötheln" in Bischoff, Hoffmann, and Schiening's "Lehrbuch der Militärhygiene," vol. ix, 1912, that "special measures of disinfection and isolation are not necessary." Of course if German measles were treated without measures of isolation, it would be necessary to be very careful in diagnosis, lest any cases of measles or scarlet fever should be mistaken for German measles, and so escape being isolated.

The conclusion to which my experience of the disease would lead me is that the first cases appearing in a station, or sporadic cases, should be isolated in the hope of aborting an epidemic, but that once the disease has attained epidemic dimensions, the trouble and expense of isolation is not repaid by the results obtained. In very few cases is hospital treatment necessary in the interests of the individual; and as the disease is specially infectious in the very early stage, it is doubtful if isolation has much effect in controlling its spread.

STERILIZATION OF INFECTED WATER IN CAMP AND ON THE MARCH IN INDIA.

By Colonel F. H. TREHERNE and Captain J. J. H. NELSON.
Indian Medical Service.

Purification of Infected Water in Camp and on the March.

At the All-India Sanitary Conference held at Madras in November, 1912, Captain W. C. Ross introduced a paper in which he referred to the "folly of boiling water for drinking purposes." He stated that it is a common error to believe that the boiling of water is the safest way of making it potable, and in support of his statement he laid down that nearly all surface waters, which are practically the only waters available in this country, contain a good deal more than a trace of organic matter, much of which is living, and in their natural state swarm with bacteria. The boiling of the water does nothing more than manufacture a very dilute and sterile bouillon than which there could be a no more generally useful medium for the cultivation of most organisms.

Notwithstanding the manufacture of this sterile bouillon by boiling the drinking water for troops in camp, it is doubtful if many medical officers would accept the responsibility of refusing to recommend careful boiling of water if cholera or other water-borne disease were prevalent in the vicinity of the camp.

There are, however, many difficulties in the efficient carrying out of this practice. It is desirable for many reasons to reduce the amount of kindling wood to the smallest limits, and even if there were no difficulty in the supply, the supervision required must be very perfect to ensure the complete sterilization of the water. When large quantities of water are required, and required in haste, frequently the water is not heated sufficiently to render it absolutely safe. Then the process of cooling to the requisite temperature for drinking purposes has to be taken into account.

From a practical point of view, therefore, in the absence of a Griffith's sterilizer or other apparatus, any efficient mode of making the water potable would be worthy of consideration when dealing with troops in camp or on the march.

Various methods of sterilization by chemicals have been proposed from time to time, such as the addition of permanganate of potash, hypochlorite of lime, perchloride of mercury and acid sulphate of soda.

The object of this paper is to point out the advantages of purifying infected water for drinking purposes by means of chlorine, for this can easily be accomplished without giving the water an unpleasant taste or appearance.

Doctors Nasmyth and Graham have shown that 0·3 parts of chlorine in 1,000,000 parts of water will not only destroy typhoid and colon bacilli, but practically all bacteria in water except a few spore formations. They therefore recommend "chloride of lime" for this purpose. The chief objection to the use of this material is that it rapidly deteriorates, and in order that it may be of value, it is necessary to obtain the drug fresh from the factory.

Their method, as described in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, is to take a teaspoonful of chloride of lime, remove the excess of powder by rolling a pencil along the top of the spoon, and then dissolve the powder in a cupful of water. After adding three more cupfuls of water a stock solution is made which will keep for four or five days in a tightly stoppered bottle. By adding one teaspoonful of this milky stock solution to two gallons of water, all typhoid, colon and bacilli producing dysentery will be effectually destroyed in ten minutes. This result is accomplished by making a solution of 0·5 parts of free chlorine to 1,000,000 parts of water. It is free from taste or odour, and the trace of free chlorine rapidly disappears.

Doctor Nasmyth treated the water in Toronto Bay on the spot, and this would correspond to our troops drawing water from one of the large tanks in the district.

His experiments gave the following results:—

(1) 16,000 bacteria with *B. coli* present. In half an hour after chlorination at a strength of 1 in 1,000,000 there were 18 bacteria and no *B. coli*.

(2) 25,000 bacteria with *B. coli* present. After chlorination, there were 9 bacteria and no *B. coli*.

(3) 18,000 bacteria with *B. coli* present. After chlorination, there were no bacteria.

Other authorities have found free chlorine equally efficacious. Thus, Dr. Thresh states that no water has been found which cannot be sterilized by 2 parts of chlorine per 1,000,000 parts of water.

At Cambridge, the water contains an exceptionally small amount of organic matter, and it was found that when chlorine was added in the proportion of 1 to 4,000,000 and remained in contact for half an hour, the water became sterile.

Major Dansey-Browning, R.A.M.C., speaks highly of the value of bleaching powder in the proportion of 21 grains to each military water cart containing 100 gallons of water. This would make a solution of one part of free chlorine to 1,000,000 parts of water.

In the "Manual of Elementary Military Hygiene" recently issued from the War Office, a reference is made to the sterilization of water by chlorine used in the form of bleaching powder. The bleaching powder "deteriorates quickly if exposed to the air, light or moisture, and must therefore be kept in sealed tins; 25 grains of bleaching powder should be used for every 100 gallons of water."

Bleaching powder contains, when freshly prepared, about 33 per cent of available chlorine. Hence, if 25 grains are added to 100 gallons this would produce a solution of 1 in 850,000.

The amount of chlorine necessary depends upon the amount of organic matter present, and this can be determined by the starch and iodine colour test.

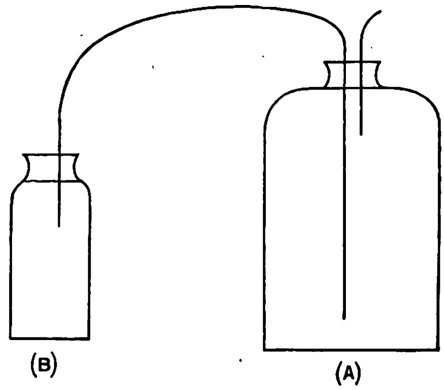
In India, the amount of organic matter present in surface water is frequently large, and consequently the proportion of chlorine must be correspondingly large. At the same time, the amount of chlorine must not be so large as to make the water taste, otherwise objections will be raised to its use.

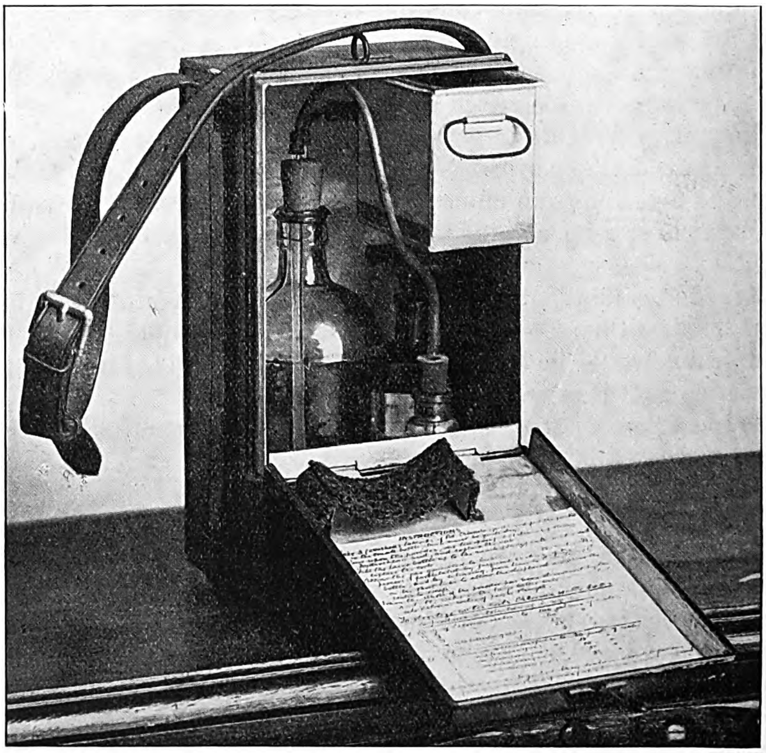
Since it is difficult to obtain bleaching powder in a fresh condition in India experiments have been made with a view to preparing chlorine from chlorate of potash and strong hydrochloric acid, which can be obtained from the dispensary of any station hospital.

As 100 gallons of water equals 7,000,000 grains, to obtain 1 in 1,000,000 then 7 grains of available chlorine would be required; or 14 grains would be required for 1 in 500,000. It is in the latter proportion that it is proposed to use the chlorine.

Preparation of the Solution.—A simple apparatus has been made with two bottles, one (A) with a capacity of 32 oz., and a second (B) holding about 1 oz.

The stopper of (A) is perforated and two pieces of glass tubing (0·5 mm. in diameter) are passed through the holes. One piece of tubing is long, reaching almost to the bottom of the bottle, and the second piece is short, only just passing through the stopper. The stopper of (B) is also perforated and one short piece of glass tubing is inserted. The two bottles are then connected by means of rubber tubing, this being attached to the long piece of glass in bottle (A). To make the chlorine water, 25 grains of potassium chlorate are placed in bottle (B) with 2 drams of strong


(B)
(A)



hydrochloric acid. The stopper is at once inserted and the gas evolved will bubble through the water in (A) and form a solution. The process is facilitated by frequent shaking of the bottle (B).

A compact portable case fitted with a strap for carrying the sterilizing outfit has been made in the workshops of the 2nd Queen Victoria's Own Sappers and Miners. It consists of a stout tin case measuring 12 × 7 × 5 in. It weighs about 6 lb., and contains a complete chlorine generator as described; two acid bottles with glass stoppers and covers, with a capacity of 2 oz. each, for strong hydrochloric acid; a 4 oz. measure glass, and a small bottle holding 80 five-grain tabloids of potassium chlorate.

This case, without replenishing, contains sufficient material for sterilizing over 3,000 gallons of water..

When using tabloids of potassium chlorate, they should first be powdered, otherwise they will only be dissolved slowly by the acid.

Results of Experiments.

In all experiments a strength of 1 in 500,000 of chlorine gas was used.

In this strength, no taste is imparted to the water, which remains neutral in reaction.

No. of experiment	Date	Source of water	Medium used	Total Colonies after 48 hours' incubation	
				Before chlorine	½ hour after chlorine
I	26.11.12	Tap water contaminated with 24 hours' fresh culture of *B. typhosus*	Agar ..	Innumerable	Nil.
II	29.11.12	Tap water as above	*Drigalski-Conradi*	500 per c.c.	,,
III	3.12.12	Tap water contaminated with 24 hours' growth in broth inoculated with urine	Agar ..	Innumerable	,,
IV	4.12.12	Bangalore water supply before sedimentation or filtration. (See further details about this water)	,, ..	250 per c.c.	,,
V	7.12.12	Tap water contaminated with 24 hours' culture in broth of *B. typhosus* and *Staphylococcus aureus*	,, ..	1,200 per c.c.	,,
VI	9.12.12	Water from surface tank at twelfth milestone on Dodballapur Road. (See further details about this water)	,, ..	900 per c.c.	,,

The above results are a few examples of many experiments. They indicate that 1 part of chlorine to 500,000 parts of water will render the water absolutely sterile in half an hour.

Experiments IV and VI were carried out on the lines advocated by Clemesha. The presence of lactose fractors was determined, and the organisms present classified.

With reference to Experiment IV, the details were as follows:—

Source.—Bangalore water supply before sedimentation or filtration	Colony No.	Motility	Gram's stain	Spores	Gelatin liquefaction	Indol	Litmus milk	Lactose	Saccharose	Adonit	Dulcit	Inulin	Voges-Proskauer	Name of organism	
Date of collection, December 4, 1912	1	–	–	–	–	–	+	+	+	+	–	–	+	*B. lactis aerogenes.*	IV.
Date of examination, December 4, 1912	2	–	–	–	–	–	+	+	+	+	–	–	+	,, ,,	IV.
Total colonies on agar at 37° C. per c.c., 250	3	–	–	–	–	–	+	+	+	+	–	–	+	,, ,,	IV.
MacConkey's bile salt broth .. .. + –	4	+	–	–	+	–	+	+	+	–	–	–	+	*B. cloacæ.*	IV.
Four tubes containing 5 c.c. of sample 3 1	5	+	–	–	+	–	+	+	+	–	–	–	+	,,	IV.
Four tubes containing 1 c.c. of sample 1 3	6	–	–	–	–	–	+	+	+	+	–	–	+	*B. lactis aerogenes.*	IV.
Four tubes containing 1 c.c. of sample 0 4	7	–	–	–	–	–	+	+	+	+	–	–	+	,, ,,	IV.
Fæcal bacilli present in 15 c.c.	8	–	–	–	–	+	+	+	+	–	–	–	–	*B. coscoroba.*	III.
	9	+	–	–	+	–	+	+	+	–	–	–	+	*B. cloacæ.*	IV.
	10	–	–	–	–	–	+	+	+	+	–	–	+	*B. lactis aerogenes.*	IV.

Group I, Nil. Group II, Nil. Group III, One. Group IV, Nine.

This water, therefore, contained only organisms of great resistance to sunlight. Half an hour after being treated with chlorine (1 in 500,000), no lactose fractors were obtainable in 40 c.c. and no colonies grew on agar inoculated with 1 c.c. The water was rendered sterile, even the very resistant Group IV of Clemesha being killed.

Three samples of the same water were examined after sedimentation and filtration through the Jewel filters from which the water supply of Bangalore is obtained. No lactose fractors were present in 40 c.c. of each sample, but the colony counts on agar were 12, 8 and 10 per c.c.

Hence by comparison, the chlorine treated water was superior to the filtered specimens, and it is a proof of the value of chlorine in rendering water absolutely safe.

With reference to Experiment VI, the water was collected from an ordinary tank about half a mile long and a quarter of a mile wide. It was fairly clear and the surface well sunned. The water is used for irrigation, &c., but in addition it had been used two days previously by the 7th Q.O. Hussars to water their horses during a night's bivouac in its vicinity.

Bacteriologically the water was bad, showing signs of recent contamination as evidenced by the presence of four colonies of Clemesha's Group I.

The details regarding the flora present are as follows :—

Source.—A tank at 12½ milestone on the Dodballapur Road. The tank is surrounded by cultivation and 400 yards from any village. Used for irrigation and watering of cattle.	Colony No.	Motility	Gram's stain	Spores	Gelatin liquefaction	Indol	Litmus milk	Lactose	Saccharose	Adonit	Dulcit	Inulin	Voges-Proskauer	Name of organism	
Date of collection, December 9, 1912	1	+	−	−	+	−	+	+	+	−	−	−	+	*B. cloacæ.*	IV.
Date of examination, December 10, 1912	2	+	−	−	+	−	+	+	+	−	−	−	+	,,	IV.
Total colonies on agar at 37° C. per c.c., 960	3	+	−	−	−	+	+	−	−	−	−	−	−	*B. grunthal.*	I.
MacConkey's bile salt broth	4	−	−	−	−	+	+	+	+	−	−	−	−	*B. coscoroba.*	IV.
Four tubes containing 5 c.c. of sample + 4, − 0	5	+	−	−	−	+	+	−	−	−	−	−	−	*B. grunthal.*	I.
Four tubes containing 1 c.c. of sample + 3, − 1	6	+	−	−	−	+	+	+	−	−	+	−	−	*B. coli communis.*	I.
Four tubes containing 1 c.c. of sample + 1, − 3	7	−	−	−	−	−	+	+	+	+	−	−	+	*B. lactis aerogenes.*	IV.
Fæcal bacilli present in 1 c.c. and upwards	8	+	−	−	−	+	+	+	−	−	+	−	−	*B. coli communis.*	I.
	9	+	−	−	+	−	+	+	+	−	−	−	+	*B. cloacæ.*	IV.
	10	+	−	−	+	−	+	+	+	−	−	−	+	,,	IV.

Group I, Four colonies. Group III, Nil.
Group II, Nil. Group IV, Six colonies.

This water was treated with chlorine 1 in 500,000 and examined half an hour later, when no lactose fractors could be found in 40 c.c. and no colonies grew on agar inoculated with 1 c.c. of the water.

This clearly demonstrates that a badly polluted water, which would be condemned off-hand, can be transformed into an absolutely safe source of supply for all purposes in a short space of half an hour.

These observations confirm fully those made by Thresh, Dansey-Browning, Nasmyth and others, and by using the simple apparatus for preparing the chlorine as above described, the difficulty of securing in India fresh bleaching powder does not arise.

Period of Potency of the Chlorine Water.

Experiments were carried out to determine how long the chlorine water, prepared as advised, continued to remain potent, so that when added to water it would still sterilize. It was found that if the bottle is kept stoppered with an ordinary cork for a period of three or four days, sterilization of any water took place in

half an hour. Beyond this time the efficiency diminished owing to the escape of gas. If impermeable stoppers were used there should be no loss of potency.

The important point about this observation is that a small party of men detached for a few days from the main body might be given sufficient chlorine solution to sterilize their drinking water.

Practical Application of the Process.

Recently the above suggestions have been put to the test. The 20th Deccan Horse marched in October, 1912, from Bangalore to Secunderabad. Most of the march was at some distance from a railway line. There had been much rain, and dry wood was difficult to obtain. The line of march was through a country in which cholera was prevalent, and it was most essential to obtain pure water for drinking purposes.

On account of the difficulty in obtaining fuel for boiling the water it was decided to adopt the chemical purification of water.

All arrangements were organized and carried out by Major A. N. Fleming, I.M.S., the Medical Officer in charge of the Regiment, with most successful results.

The sources of water supply were from wells, tanks and rivers. With wells, after measuring the quantity of water in each, the requisite amount of chlorine water was thrown in. With tanks and rivers, besides the usual precaution, the requisite quantity of chlorine water was added to each pakhal, and the pakhals were utilized for filling the "diggies."

The lungars or cooking places, the officers' mess and the soda water factory were each provided with a "diggie."

All the water that was used was sterilized, and there were no complaints of any unpleasant taste.

This method of sterilizing the water has been in use during the recent battalion training of the Queen's Own Cameron Highlanders, and on other occasions when they have been in camp. The quartermaster has reported that the facility in treating the water was the greatest possible relief to him because he had never succeeded in satisfactorily sterilizing all drinking water by heat owing to the impossibility of cooling it in any reasonable time.

The apparatus, or a small quantity of freshly prepared chlorine water, has been taken out by officers when on shooting expeditions in the jungle, where only water of a very doubtful quality could be obtained. The reports have been most satisfactory, and by aerating the chlorinated water, no taste or smell of the chlorine could be detected.

Method of Procedure.

It is useless to sterilize turbid drinking water without previous clarification, for no man will believe muddy water is harmless. It becomes necessary, therefore, to clarify the water first by any of the processes described in the R.A.M.C. Training and the "Manual of Elementary Military Hygiene."

A battalion of British Infantry in India is provided with sixteen pairs of pakhals, each of which will hold about 6 gallons of water. It is calculated that these pakhals carry enough water to refill the whole of the water-bottles carried by the men, each bottle holding about one and three-quarter pints (one litre).

Thirty-two fluid ounces of chlorine water are prepared at a time; this allows 1 oz. for each pakhal when filled with water.

It is, therefore, proposed that whenever a pakhal is filled with water 1 oz. of chlorine water should be poured in at once. The shaking caused by the movements of the mule will be sufficient to thoroughly mix the solution, and the water will be ready for issue in half an hour's time.

An ordinary canvas "diggie" holds about 60 gallons of water. Hence 10 oz. of chlorine water will be required. But if the "diggies" are filled by means of the pakhals, the water in these will have been sterilized at the source of the supply, and the pouring of it into the tank will tend to cause the free chlorine to be dispersed, after it has accomplished its object in purifying the water.

Proportion of Chlorine Water Required.

32	oz. of	chlorine	water to	192	gallons	of water.
20	,,	,,	,,	120	,,	,,
10	,,	,,	,,	60	,,	,,
1	,,	,,	,,	6	,,	,,
4	fluid drachms of	chlorine	water to	24	pints	of water.
2	,,	,,	,,	12	,,	,,
1	,,	,,	,,	6	,,	,,

When used in this proportion a solution of one part of free chlorine to 537,593 parts of water is obtained.

When small quantities of drinking water are required, ½ oz. of chlorine water should be added to an ordinary stable bucketful (about 3 gallons) of water and thoroughly mixed. If the water is muddy it should first be strained through a cloth. Half an hour afterwards, the water will be fit to drink, and if any chlorine gas can be detected by smell or taste, it can be dispersed by agitating the water or by pouring it from one vessel to another.

Clinical and other Notes.

TROPICAL MEDICINE AND HYGIENE.

NOTE BY DR. A. W. G. BAGSHAWE.

THE subjects discussed at the International Congress of Medicine by Section 21 (Tropical Medicine and Hygiene) were Plague, Beriberi, Sanitary Organization in the Tropics (with Section 20), Leishmaniasis, and Relapsing Fever.

In an interesting paper by C. J. Martin and Bacot on the "Mechanism of Transmission of Plague by Fleas" it was shown that the transmission is effected, in some cases at least, through the mouth-parts of the flea. In certain fleas the œsophagus becomes blocked by growth of pest bacilli. They make strenuous efforts to suck and in doing so convey plague. Ultimately, if the flea survives long enough, the œsophagus becomes clear again. Dr. Wu Lien Teh (China) showed that the tarbagan as a reservoir of plague has obtained much more attention than it deserves.

At the conclusion of the beriberi discussion resolutions, modified from others brought forward by Dr. Braddon, were proposed by Dr. C. J. Martin and carried by a large majority. They were to the effect that in many natives, whose staple food is rice, beriberi is induced by the consumption of over-milled rice; that the use of such rice should be restricted as far as possible; and that quarantine for beriberi at ports should be abolished.

In the discussion on Sanitary Organization, Dr. van Loghem proposed the appointment of an International Commission to study plans for international action to prevent the spread of yellow fever to Asia on the opening of the Panama Canal. Sir Patrick Manson proposed, as an amendment, that the first move to secure international co-operation should be taken by the Dutch Government. The amendment was carried.

An International Committee of members of the Section, with Sir John McFadyean, was formed to discuss the nomenclature of Malta fever. They recommended that this disease should henceforth be known as undulant fever, and this recommendation was adopted unanimously by the Section.

THE TREATMENT OF GONORRHŒA BY THE "HOT BOUGIE" METHOD, AT THE MILITARY HOSPITAL, PORTOBELLO, DUBLIN.

By Captains A. T. FROST, A. S. LITTLEJOHNS, and P. SAMPSON.
Royal Army Medical Corps.

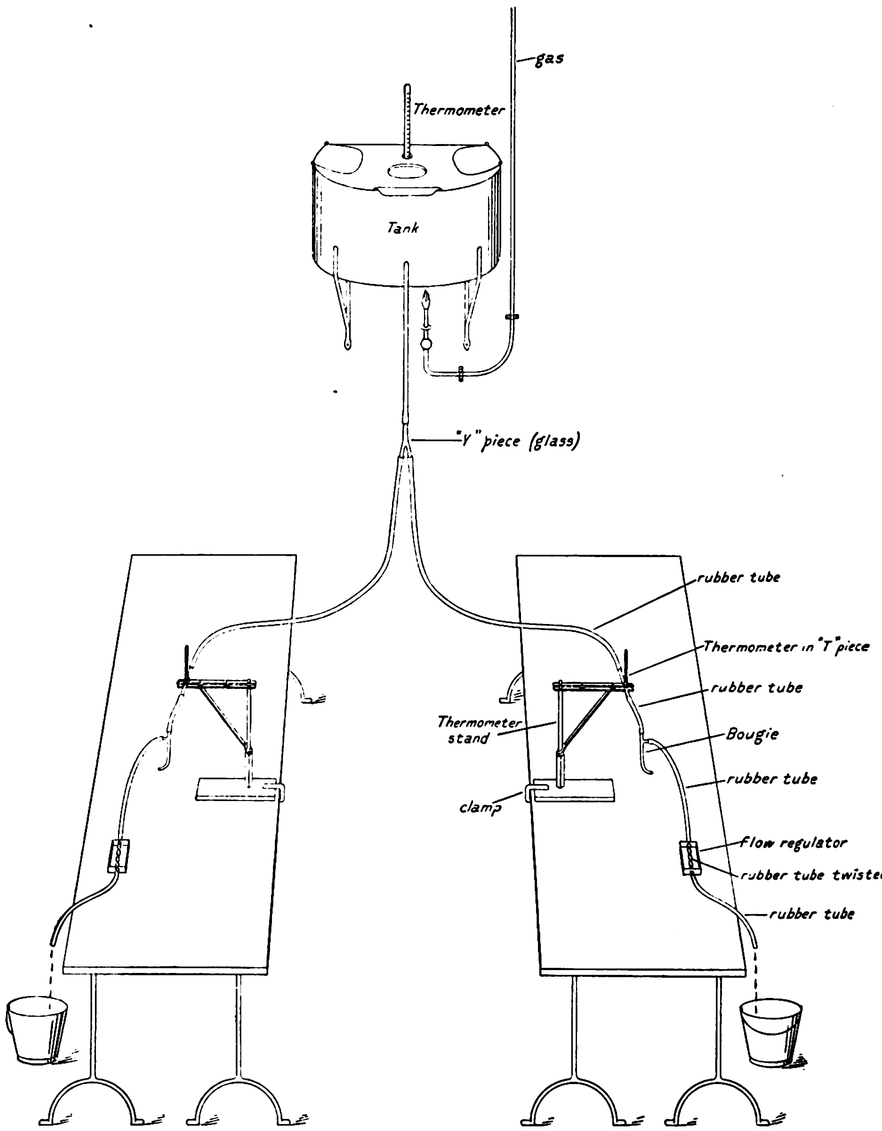
In the Journal of the Royal Army Medical Corps for the month of February, 1913, an article by Majors L. W. Harrison and G. J. Houghton, R.A.M.C., on the treatment of gonorrhœa by means of the introduction of a water-heated bougie attracted our attention, and we decided to try the effect on a number of cases, some of which had been in hospital for months without lessening the discharge or the number of gonococci in each microscopic field of a stained smear from the urethra.

The bougies having been obtained, we made some trials to determine the most satisfactory means of maintaining a constant water circulation, and have adopted the following plan:—

An iron vessel, capable of holding about a gallon, is fixed to the wall with a Bunsen burner beneath it. A rubber tube about 2 ft. long, terminating in a "Y" piece (made of glass), distributes the water from the tank to two smaller tubes attached to the "Y" piece, thus enabling us to treat two cases at the same time; these smaller tubes lead to two tables placed side by side, one on each side of the tank. Clamped to each table is a device for holding a thermometer. It consists of a horizontal arm swinging on an upright and holding a "T" shaped glass tube. A thermometer is fitted by a rubber cork into the vertical limb of the "T" in such a way that the mercury bulb is in the horizontal limb and in the current of water which flows through it when one of the small rubber tubes is attached to one end. The other end of the "T" piece is attached by a few inches of rubber tubing to the bougie in position in the patient's urethra. The outflow from the bougie is carried away by another rubber tube, which is fitted with a simple device to regulate the rate of flow of the water. The regulator consists of a small box without lid or bottom, 4 in. long by 3 in. in width. Two pieces of glass tubing are firmly fixed to the two opposite sides, and project 1 in. both inside and outside the box, so that the outside ends may be attached to the outflow tube from the bougie and to a tube conveying the water to a bucket, respectively. The glass ends inside the box have another tube uniting them. This is twisted so that there are several turns in its length, like a corkscrew; the torsion narrows the calibre of the tube, and by screwing the rubber to the right or left on the glass tube at either end, the rate of flow is increased or diminished. Friction between the tube and the rubber cork prevents the rubber tube from uncoiling. The arrangement of the apparatus is shown in the diagrams.

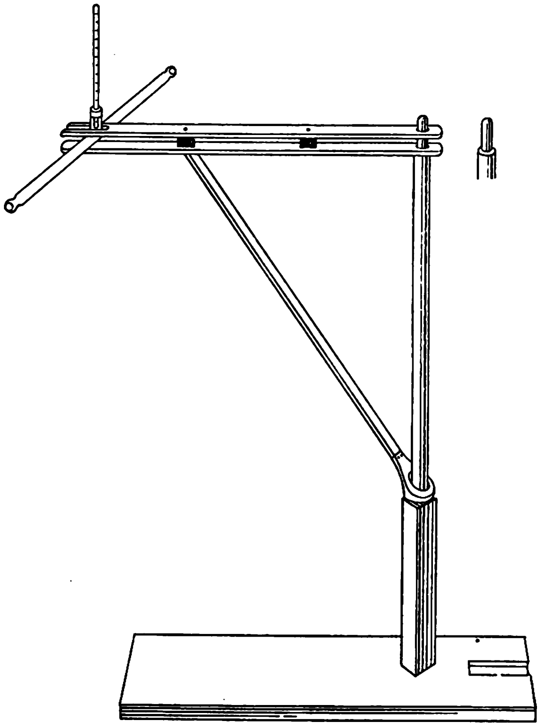
Quite early we found that sensation was not a sufficient guide as to

the amount of heat the urethra would stand, for one case had his meatus blistered when the thermometer registered 127° F., and another at 125° F., though neither at the time complained of the heat. The temperature of



the water in the tank is maintained at about 180° F., and all further heat regulation is done by varying the rate of dropping from the outflow. The thermometer placed between the tank and the bougie was originally

kept at 120° F., but latterly at 125° F., and maintained at this for the half hour of treatment. If the temperature is allowed to rise a degree or two higher than 125° F. the patients complain of pain, and we consider that 125° F. is the most efficient temperature. Two cases can be managed in this way, on the two tables referred to, and we believe that three patients could, if necessary, be equally well attended to at the same time. Over eighty cases have been treated up to date, but for statistical purposes we can only include fifty of these. At first the treatment



was only given once a week, later twice a week, the effect on the discharge being noted microscopically. The examinations have been done systematically, and the same points looked for and recorded in each case. These points are: The relation of pus to epithelium; the number of gonococci; whether they are free or intercellular; the percentage of cells infected, or if the gonococci are free, the number per field.

The subsequent treatment of the cases is regulated by the microscopic findings.

Owing to the fact that the urethral exudation contained red blood cells

when examined immediately after the hot bougie, it was thought that a daily application would not be advisable. One could not be certain that every gonococcus had been killed by the heat, at the first application, and the vitality of the urethra must be lowered by a temperature of about 118° F. applied to the mucous membrane for half an hour, thus rendering it more liable to infection. We therefore allowed a few days for the urethra to recover. That there is some truth in this idea has been further strengthened by our observation on resistant cases, in whom a rapid improvement occurred on again resuming bougie treatment after a rest of ten to fourteen days (they had three bougie applications before the interval of rest). We have no doubt that this treatment constitutes an advance in the management of gonorrhœa, by lessening the number of days in hospital for all varieties of cases, no matter at what stage they are taken. Of the fifty cases a number had been in hospital for months without any improvement, but cleared up rapidly with the hot bougie. The average number of days in hospital of the fifty cases, after the treatment by bougie was started, was 22·8 days, while 25 of the early cases, that is, treated from the beginning by the hot bougie, averaged 18 days in hospital. Two cases are of special interest, each had been in hospital for months, unaffected by treatment. In the first, each weekly examination showed large numbers of pus cells and gonococci. The note after the first application was: epithelium to pus ratio, 1 to 500, and gonococci numerous. After the second application of heat, three weeks rest was allowed; two further hot bougies at four days' interval caused all pus and gonococci to disappear finally. This was our first case and encouraged further trial.

The second case was even more remarkable in the rapid cure of the disease. His condition was similar to the last case, but three days after the first hot bougie the microscope only showed one pus cell and one gonococcus in four fields. Three days after the third application there were no pus cells and no gonococci. He has since been free from the complaint.

No atropine suppositories were used in the eighty cases, and only two mild cases of epididymitis occurred in the series.

The following are a few typical microscopical results :—

Case 1.—On admission, blood, pus and a few epithelial cells, with 5 per cent of pus cells infected. One week later immediately after the heated bougie the smear showed 1 per cent of pus cells slightly infected, and the relation of pus cells to epithelium as 1 to 15. A stained slide taken on removing the bougie (third application) showed only epithelium and no gonococci. Weekly examinations failed to reveal any recurrence.

Case 2.—Before the treatment, the smear from the discharge contained pus and epithelial cells in the ratio of 20 to 1, with free gonococci in every field. Examined after the second bougie, no

gonococci were seen, and the proportion of pus to epithelium was found to be reversed. On the fourteenth day no pus cells or organisms were found, and only a few epithelial cells. No relapse has occurred for three months.

It would appear that the hot bougie is a most efficient means of deciding whether a cure has taken place, for cells and gonococci are brought to the surface with more certainty than by the application of silver nitrate, or prostatic massage. Some cases which had no discharge for some time showed a profuse one when the hot bougie had been removed. In the cases which were in the latent stage, gonococci could be found, of which the existence was only suspected previously, as the epithelium pus ratio had not varied for a few weeks. Irrigation by Maiocchi's tube was discontinued in a few cases during the bougie treatment, but there was not the same progress as when the two were combined.

Conclusions.

The hot bougie is a distinct advance in the treatment of gonorrhœa, and in our opinion, when combined with irrigation, it affords the best means of treatment at present available. We are not satisfied that we have yet found the most efficient means of using it, or what intervals will give the best results. The interval we allow at present is four or five days. In our hands acute and chronic cases have done equally well; many cases which had been in hospital for a prolonged period rapidly cleared up when the hot bougie treatment was introduced. There have been five relapses in 83 cases up to the present, and all except one of these have been microscopically free from gonococci and pus cells after one further application of the hot bougie and a few days irrigation.

Our best thanks are due to Lieutenant-Colonel O. R. A. Julian, C.M.G., for his advice and suggestions in carrying out the treatment, and also for the facilities afforded us in arranging and obtaining the apparatus during the early stages of the experiment; also to Captain T. E. Harty, R.A.M.C. for designing the thermometer stand.

EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS, IN SUBJECT (C) FOR PROMOTION.

By Major E. T. F. BIRRELL.

Royal Army Medical Corps.

As a practical and oral examination in "Duties in the Field" has only lately been introduced for the Royal Army Medical Corps, the following description of a recent examination in subject (C) for lieutenants, in which a subaltern of the Corps was one of the candidates, is published

in the hope that it may be of interest to captains and subalterns about to present themselves for the examination.[1]

As a rule, the examination in subject (C) cannot be taken until an officer has passed the written examination in subject (D), certain portions of which are included in the subjects in which R.A.M.C. officers are examined,[2] and subalterns of the Corps must have completed twelve months, and captains five years' service, before presenting themselves for any part of their promotion examination.[3]

The actual examination is conducted by a Board of officers of the various arms of the service, including a R.A.M.C. officer, not below the rank of major, when an officer of that corps is a candidate.[4] The object being to ascertain if an officer is or is not fit practically for promotion, the aim of the Board is to test his ability of applying his knowledge practically, rather than to find out whether he is familiar with a certain amount of book-work.[5] The Board is required to set a simple tactical scheme dealing with a small force of all arms, and involving several situations, and the examination takes place out of doors on the scene of the supposed operations. The various situations and the questions and problems set on them are usually handed to the candidates on hectographed slips of paper, and after a brief period for the study of the information and problems written on the slips, the Board examines each candidate by a series of questions, or by a practical test, bearing on the situation. Note-books and maps are provided, and the candidates bring compasses and field-glasses with them.

The same tactical scheme serves for officers other than R.A.M.C. in their subject (Ci), and for the R.A.M.C. candidates in (Cii). The latter consists of a practical test in the solution of the problems affecting the medical service in the general scheme, and also in questions on map reading.

Marks are allotted by the Board to the various tests, and candidates must obtain ·6 of the aggregate marks. King's Regulations state that if an officer fails twice in the examination he will not, as a rule, be permitted to remain in the service.[6]

On the occasion about to be described the history of a small mixed force supposed to be near St. Albans, was followed for the two successive days during which the examination lasted. Candidates and the Board were instructed to bring bicycles.

On assembling at the railway station before leaving London a paper

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[1] See King's Regulations, para. 861 (2 and 3), and Appendix XI, pp. 389-390.

[2] *Ibid.*, para. 866.

[3] *Ibid.*, para. 861 (2 and 3).

[4] *Ibid.*, para. 875.

[5] *Ibid.*, Appendix XI, p. 389.

[6] *bid.*, para. 867.

containing the following information and instructions was handed to each candidate:—

"On arrival at St. Albans the officers will be familiar with the following:—

"General Idea.

"Sheet 29, St. Albans, represents a country 'Red' which has been invaded by two Blue Divisions from Bedfordshire.

"On the evening of May 14 the positions of the opposing forces are as follows:—

"Two Blue Divisions about Stevenage and Walkern with line of communications through Hitchin and Baldock.

"One Red Division about Ware and Hertford based on London.

"Special Idea (Red).

"A Red Detachment consisting of: 1 Squadron of Cavalry, 1 Battery of R.F.A., 1 Field Company R.E., 2 Battalions of Infantry, 1 Field Ambulance, 1 Horse Company A.S.C., is on the morning of May 15 at Watford.

"This detachment is ordered by G.O.C. Red Division to march on May 15 and attack the enemy's line of communications.

"Red is known to be nervous of his right flank.

"On May 15 at 2 p.m. O.C. Detachment marches north via St. Albans and Wheathampstead.

"The detachment carries four days' rations.

"*Situation No.* 1. *First Day.*

"Officers assemble just north of St. Albans where they will be required to give the composition of the advanced guard of the detachment; also the position of all portions of the advanced guard, as the main body enters St. Albans."

The problem set for the R.A.M.C. candidate was varied as follows:—

"The R.A.M.C. officer will be required to grasp all the military situations given to the infantry candidates, and be prepared to answer questions affecting the medical arrangements required by each situation.

"*Situation No.* 1. *First Day.*

"Assuming that the advanced guard consists of one-eighth to one-fourth the total strength of the Red Detachment, state:—

"(i) The medical personnel and material which are likely to have been detailed to accompany it.

"(ii) The position, in relation to other troops of the advanced guard, of the R.A.M.C. with it, in Situation No. 1.

"(iii) The general instructions that you would expect the senior officer R.A.M.C. with the advanced guard to have received regarding the disposal of casualties."

On arrival at St. Albans the candidates were conducted to a selected point on the outskirts of the town and given a short time to locate themselves by their maps, and then called up individually to be questioned on the lines of the problems contained in the first situation. On coming before the Board all candidates were required to show their exact position on the map,[1] and to point out and show on the map the various features of the surroundings. The examination in map reading was more thorough in the case of the infantry and other candidates than for the R.A.M.C. officer.

Bicycles were then mounted, and officers proceeded to the spot mentioned in Situation No. 2, which was then issued:—

"*Situation No. 2. Second Day.*

"The officers assemble at the junction of roads and railway just north-east of Marshalswick and are given the following:—

"It is 5.30 p.m., as the detachment marches into St. Albans.

"The O.C. receives information from an inhabitant of Wheathampstead that the village is occupied by a Blue force. This information is confirmed by a message from the Cavalry Squadron Commander. The information of the enemy's strength is too vague to be reliable.

"At the moment the cavalry squadron is disposed as the candidates desire, whilst the advanced guard infantry is on the road near where the officers are assembled with the advanced guard artillery, R.E., &c., in rear of the infantry.

"The following message is received by O.C. Advanced Guard:—

"'The O.C. detachment decides to proceed no further to-day. The force will billet in St. Albans for the night. Outpost companies will be posted at 7.15 p.m.'

"Required from officers:—

"As O.C. Advanced Guard give orders to the several parts of your advanced guard on receipt of this message."

For the R.A.M.C. candidate the problem was varied as follows:—

"(i) As senior officer R.A.M.C. with the advanced guard, on hearing from the commander of that body that the Red detachment will proceed no further that night, and that he is about to post outposts, what proposals for medical arrangements would you make to him?

"(ii) At 6 p.m. you received a verbal message from a mounted orderly that 'a cavalry soldier is lying with a broken leg at the vicarage in Sandridge.' What steps would you take?"

On the completion of this portion of the examination, Situation No. 3 was issued:—

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[1] For the general scope of the examination in map reading, see King's Regulations, Appendix XI, p. 189.

"*Situation No.* 3. *First Day.*

"(*a*) Questions on Billeting.

"(*b*) Officers will be shown by the Board the position of the detachment's billets and of its line of defence in case of attack.

"They will then show on a sketch map which will be given to them the position of one outpost company in detail with the direction of and instructions for the patrols.

"They will reconnoitre and enter on the sketch map all topographical details, paths, and roads which affect their outpost company.

"Time allowed two hours. Hand in at Peahen Hotel, St. Albans at Lunch."

The R.A.M.C. officer was shown on a sketch map the actual positions of the outpost company, and questioned as to the medical arrangements necessary for it, being told that a bearer subdivision of a field ambulance, with two officers, four or five non-commissioned officers and men of the tent division, a forage cart, and water cart, had been allotted to the advanced guard for the purpose. He also received the following special task:—

"*Situation No.* 3. *First Day.*

"(*a*) Questions on billeting (these were on the general subject).

"(*b*) As an officer with the main body you are detailed to inspect the billets allotted to the detachment before they are occupied.

"Carry this out, and write a brief report to the senior medical officer regarding any sanitary information concerning them, of which you consider he should be placed in possession.

"(*c*) You are also detailed to select accommodation for a temporary hospital of 150 beds, and to make preliminary inquiries as to material and equipment which may be available in St. Albans.

"Carry this out and submit a brief report to the senior medical officer.

"Time allowed two hours. Hand in at Peahen Hotel, St. Albans at Lunch."

Candidates handed in their maps and reports and were questioned on them by the Board. This completed the work for the first day.

Next day, on assembling on the ground, the history of the force was resumed.

"*Situation No.* 1. *Second Day.*

"Officers assemble at junction of railway and road north-east of Marshalswick.

"It is 5 a.m., on May 16, one hour before the main body will resume its march north.

"The officers command the new advanced guard and have received from the O.C. the following information which has been given by infantry patrols:—

"The enemy advanced at dawn this morning and drove the Red patrols out of Sandridge Village and Hill End Farm, and Red and Blue patrols are now engaged in the woods S. and S.W. of Hill End Farm. The bulk of the Red cavalry, viz., three troops, are in rear of the Marshalswick picket. The remaining troops of the Red advanced guard are marching out of St. Albans."

The R.A.M.C. candidate was told to consider himself the senior officer R.A.M.C. with advanced guard, and that the medical arrangements made for the advanced guard in agreement with situation No. 2, first day, continued in force, and that the hospital selected by him for situation No. 3, first day, was now established.

He was given the following slip:—

"The advanced guard has a good many wounded across its front.

"(i) As the Red patrols retired what arrangements could be made for the wounded?

"(ii) How could those casualties which had been collected be dealt with?"

Two more situations followed, dealing in detail with the exploits of certain infantry companies of the advanced guard during the subsequent engagement with the Blue troops; but as they offered little on which to examine the R.A.M.C. candidate, special situations were given to him, on the more general medical questions affecting the whole Red detachment:—

"*Situation No. 2. Second Day.*

"The O. C. detachment decides to attack the enemy in his position about Hill End Farm.

"(i) State the probable distribution of the medical service with the detachment for the attack.

"(ii) What general scheme would you propose for the disposal of the wounded?"

"*Situation No. 3. Second Day.*

"Questions on principles of medical service in attack and defence."

Naturally, on questions of so wide a scope as in these last two situations a subaltern candidate was expected to show little more than a general conception of the whole problem.

TROOPING SEASON, 1913-1914—A FEW NOTES.

By Major J. B. ANDERSON.
Royal Army Medical Corps.

Now that the trooping season 1913-1914 is about to commence, a little information may interest those likely to embark.

The notes must necessarily be somewhat disconnected, so that they will be made under their respective headings.

Instruction to Troops.—Besides the routine duties and usual inspections

certain lectures have to be given during the outward voyage. Three pamphlets are placed on board all transports, viz: "Hints on the Preservation of Health in India," "Precautions against Enteric Fever in India," and "Hints on the Management of a Child's Health in India." Medical officers have to explain these pamphlets to all troops, &c., during the voyage.

Antityphoid Inoculation.—When the first dose has not been given prior to embarking, both doses can be given on board, provided the first dose be given at least fourteen days, and the second at least four days before disembarkation. Nominal rolls are placed on board of men who have received their first inoculation; before departure from their station, it is unnecessary for medical officers to send the vaccine for the second inoculation, as is constantly done, for enough vaccine, together with the necessary pink slips, is placed on each transport to inoculate 600 men with their first and second doses.

Vaccines and Serum.—Each transport is supplied with twenty phials of an antidiphtheritic serum, and fifty tubes of vaccine lymph. The vaccines and serum are kept in the cold storage room until required. As an instance of not bearing this in mind, a medical officer reported he had no antidiphtheritic serum for a case on board, after taking over and signing for it. If there is any doubt about not being able to find what one requires, it is always well—after questioning the N.C.O. R.A.M.C. of the permanent staff—to refer to the "Notes for Guidance of Medical Officers in charge of Hired Transports," a copy of which is placed in the hospital of each vessel, or to approach the troop officer, who is a ship's officer. Under his charge is a certain amount of medical equipment and outside his duties he "knows the ropes." The medical officer of an Indian trooper fares better than his brother officer on a colonial transport, as the latter does not possess a permanent R.A.M.C. staff, consequently the N.C.O. embarked is always, comparatively speaking, new to his duties.

Isolation Hospital.—There is one on each transport. It may be used for any infectious disease, except tubercle, which may occur during the voyage, and for all classes of passengers including the crew, both native and otherwise. Tubercle cases are very seldom embarked at home, and those from India are embarked only on the "Plassy," on which there are special wards for men or women.

Surplus Accommodation for Sick.—In the event of the troop hospital being full, there are ample sling cots on board in charge of the troop officer. This has not always been realized.

Children under Two Years of Age.—Such children are not entitled to any accommodation. To obviate the discomfort of a mother having her child to sleep with her, there is a limited supply of small cots, which hook to the outside of the bunk, and in them the child is perfectly secure. They can be taken down, folded up, and put away in the mornings. They

have been a boon to many mothers, and thanks are due to my predecessor, Lieutenant-Colonel G. Bray, for inventing them.

Sterilized Milk.—Officers or their wives often go to the unnecessary trouble of ordering, or bringing with them to Southampton, sterilized milk for their children. There is a plentiful supply at the embarking shed, and it can be relied on, as its preparation is under supervision, and its cost is moderate; single bottles cost 4½d. per quart and a refund of 2½d. is made on each emply bottle, which can be returned by the troopship to the vendor. Any amount can be bought, and no charge is made for packing.

Lunatics.—Officers very often find it necessary to employ attendants on lunatics, in which case only two are allowed per lunatic. This number is often exceeded. In one instance last season as many as twelve attendants were engaged to look after three lunatics, and when the paymaster said he could only pay six, it caused so much discontent that the medical officer made up the difference. These attendants must not be confused with the guard over the lunatics. The latter is purely for guard duty and gets no remuneration, whereas the attendants look after the patient day and night, dressing, bathing, feeding, him, &c.

The disposal of lunatics on arrival does not seem to be generally known. Officers, unless their parents are ready to take them over on arrival, are sent to Netley. All soldiers go to Netley. The embarking medical officer arranges for women to be taken over locally by the relieving officer. If their husbands or parents wish to take charge of them, they can do so, provided they realize their responsibility and have previously made arrangements for the care of the patient, which must be to the satisfaction of the embarking medical officer.

Women Employed as Nurses on Board.—A mistake is sometimes made in promising women passengers remuneration for nursing, in excess of what the regulations allow. As an instance, last season two women on a transport were each promised 5s. a day for nursing a case. On informing them they were entitled to only 1s. a day under article 919 of the pay warrant, I had a somewhat unpleasant five minutes. By the way, the wording of this article is somewhat ambiguous, and might lead one to conclude that only one woman was entitled to payment. The pay authorities took this view, but finally waived their objection.

On Indian transports there is a stewardess, but she is one of the crew complement, and not under the orders of the medical officer. Her duties are to assist women and children in the third class when settling in their quarters, and generally to look after their comfort, especially those that are sea-sick.

Infectious Cases.—The outbreak of infectious diseases, especially measles and chicken-pox, occurs more frequently on board ship than might be supposed. The routine adopted for the disposal of such cases on arrival at Southampton is as follows: Soldiers are sent to Netley.

Women and children are admitted to the Isolation Hospital at Southampton, where they are treated at Government expense.

The responsibility of thoroughly disinfecting the clothing, &c., of direct contacts before disembarkation rests with the S.M.O. of the transport. With regard to the disposal of contacts, an infected troopship is treated in exactly the same manner as a private steamer by the Port Health authorities, i.e., the M.O.H. sends out notices by post to town and district M.O.H.'s to keep under observation contacts proceeding thither. In addition the Embarking Staff Officer at Southampton sends out to all G.O.C.'s, &c., concerned, telegrams stating what troops, furlough men, and unaccompanied families are proceeding to their command, with time of arrival, and adding to the wires, "Keep under observation (measles, &c.) last contact (date). This often necessitates a large number of wires being sent all over the United Kingdom. Sometimes furlough men and unaccompanied families proceed elsewhere than to the addresses they have given.

Hints to Officers.—As officers disembarking are invariably not posted to a station, they are considered as on leave until they receive instructions from the War Office as to when and where they are to join for duty. Being on leave they are not entitled to railway warrants, but they are entitled to such warrants from the place where they may be on leave to their new station. For this warrant they should apply to the headquarters of the Command to which they are posted, as the moment they leave the transport on leave they, *ipso facto*, cease to be in any way under the jurisdiction of the disembarking staff officer. If the cost of the railway warrant for the journey from the place when on leave exceeds the cost of a direct journey between Southampton and the new station, the difference has to be paid by the officer, and if less there is no claim on the officer's part for the difference, the public being the gainer.

Baggage, &c.—Motor cars are absolutely prohibited, and in future no privately owned dogs will be allowed a passage. All officers disembarking are responsible for the collection of their baggage, clearing it through the Customs, and for its removal from the trooping shed. All charges incurred through the employment of an agent on this account, except agency charges, are admissible against the public for the regulation quantity of baggage, and should be recovered on a travelling claim A.F. 01771. Agency changes are only admissible when the officer is prevented by military duty—e.g., accompanying the sick to Netley—when he ought to get a certificate signed to this effect by the embarking staff officer. When an officer is not posted on arrival home, and his baggage is consequently stored, he should claim for storage up to the time he receives orders to join his new station. Army form P. 1904, which can always be obtained from the Disembarkation Office, should be used for consigning military baggage by rail, otherwise full civil rates are levied.

Baggage is not disposed of by the Disembarkation Staff. If an officer

does not wish to employ an agent he should apply to the Dock Company's representative, who will take over his baggage and consign it, but in this case he should remain until all his baggage is landed and personally clear it through the Customs.

Finally, it is very necessary that R.A.M.C. officers should report their arrival home on the blue official forms supplied to every transport for the purpose. Any prospective medical officer in charge of a hired transport can have a copy of "Notes for Guidance on Outward or Homeward Voyage," by applying to the embarking medical officer for it.

Report.

THE AD DAREJA EXPEDITION, 1901.

By Major J. B. ANDERSON.

Royal Army Medical Corps.

Object of the Operations.

About eighty miles north of Aden, the Haushabi territory under British protection adjoins the Al Hamari country under Turkish protection. The frontier line was undemarcated and a tax collector in the service of the Turks built a tower at Ad Dareja within Haushabi limits, which he refused to vacate though ordered to do so by the Porte. The Haushabi tribesmen were authorized to turn him out, but failed to do so. A small party was sent from Aden to ascertain facts, and if necessary to support the Haushabis, but was fired on and forced to withdraw; consequently it became necessary to send a stronger force.

The strength of the column was 671 fighting men, with 600 to 700 followers.

Medical Arrangements.

On the afternoon of July 12, 1901, I received orders that a field force was to mobilize and leave the Crater position at 4.30 p.m. on the 14th. The medical arrangements were under my charge, and I was to be assisted by one assistant surgeon and one hospital assistant. I proceeded at once to the Station Hospital to make arrangements for drawing field equipment.

The following are what I indented for:—

1 pair field medical panniers; 1 field surgical haversack; 1 field medical companion; 1 field fracture box.

Establishment and camp equipage according to App. 33 and 34, A.R.I., vol. vi.

Medical comforts.

Hospital equipment for Indian troops, according to App. No. 1, chap. ii, iii, iv, and v, Field service departmental code, medical.

2 general service tents, 160 lb. each.

Transport.

16 saddle camels, each with a double saddle for holding 2 sitting-up patients; 8 dandies, with accessories; 20 enlisted and 28 unenlisted doolie bearers, with 8 baggage camels; 3 more camels were added later on.

According to regulation, a camel is expected to carry 400 lb., but for Aden camels an average of 250 lb. to 300 lb. could not be exceeded.

General Account.

On the evening of July 13, 1901—the day following that on which I got my orders—medical arrangements were complete, but there was a delay on account of a shortage of transport. This matter was rectified after an interval of twenty-four hours. We then got orders to move off, independently, early on the 15th, so as to arrive the same morning at Sheikh Othman, the general rendezvous, which was seven miles away from the Crater position. Before starting, however, it was found that the camels were unable to carry their loads. This caused a delay, and matters were not improved by several of the untrained, unenlisted, and (as I shall afterwards show) incorrigible Arab doolie bearers bolting, which necessitated their being replaced, which all took time. Ultimately I got off at 7.15 a.m., the Indian Hospital having previously gone on with its regiment. Before reaching the mainland of Arabia there were two tunnels to pass through and an isthmus to cross over. Another delay occurred in the first of these tunnels, which is about 300 yards long, lit by a few glimmering oil lanterns, and perfumed with the invigorating soft breeze of camelopœa which is very plentiful to windward. In this tunnel the young camels refused to proceed, and turned and twisted in all directions, in almost darkness. Had I known the peculiarities of these animals I should have taken them by a circuitous, but more open route, and probably saved much time. Needless to say, more unenlisted doolie bearers got away in the darkness. However, matters improved and we proceeded on our journey, crossing the isthmus and ultimately reaching the mainland.

The road now became wide and the going easy, but the heat was intense. After breakfasting with the General who had come out to bid us adieu, the heads of the different corps and departments assembled in the O.C.'s tent, where he gave us a very clear and concise account of the situation, order of marching and so forth, at the same time impressing on all how necessary it was to feed the men, and "keep a finger on their pulses," as he put it. The Field Hospital with the assistant surgeon was to march behind the last company of 5th Bombay Infantry, which was in rear of the main body, and Indian Infantry Hospital with its hospital assistant behind the baggage, in front of the rearguard. An unfortunate incident occurred this same afternoon. At 4 o'clock I was called to the tent of this same officer, to whom we were so looking forward to carrying us successfully through the expedition, and who had a few hours previously given us such an excellent discourse on the expedition. Unfortunately, the sun had caught him, and his symptoms were such that he had to be taken back to Aden that evening. The next senior officer now took command. Next morning we struck camp, and left for Waht at 5.45 a.m., and a more desolate, disconsolate, burning march could scarcely be imagined. The troops had done two years in Aden, so were not what one might term fit; it was the hot weather and we were marching on thick, loose sand, with not a shrub in sight. The going was slow, the sun came up and men went down. Halts had to be made, the heat getting intense, more men fell out and so on. In a very short space of time my camels and doolies were all full.

The temporary, unenlisted doolie bearers were absolutely useless. Men were told off to look after the camels and doolies, but they fell out, others were not available, and the doolies got so separated that it was impossible to keep an eye on each one individually. The enlisted men did splendid work, struggling along and falling absolutely "done" when arriving at their destinations. A slight breeze, or a little shade, would have made all the difference, and considerably assisted us, but here there was neither, the sand lying for miles in one vast undulating plain, running here and there, as snow does, into drifts. We arrived at camp Waht about 1 o'clock in the afternoon, having taken over seven hours to accomplish a march of nine miles. Meanwhile I was erecting hospital tents, and soon everything was ready to receive each man as he arrived. The last case came in about 4.30 p.m., having been out ten and a half hours. Nearly all recovered after a rest out of the sun, and it was necessary to keep only a dozen men in

hospital. I had three really serious cases of heat-stroke, one dying in about four hours. The symptoms common to most of these cases consisted of paroxysms of maniacal delirium with loud outcries, as if in acute pain and terror; these paroxysms alternated with short periods of quiescence, and were much relieved by small inhalations of chloroform, which at once alleviated all spasm and congestion.

In the local maps rivers are depicted very clearly. As a matter of fact, there were only a few puddles here, and to drink the water was out of the question. Up till now, and as far as Lahej, a march further on, we were carrying water that had been distilled in Aden, to be used for cooking and drinking. It was here the commissariat officer came and asked to see me. From his expression he was either in pain or distinctly uneasy. He had come to explain that the water had gone bad; and what on earth was he to do, the men were all parched and something to drink was an absolute necessity. The water which had been conveyed in wooden barrels, said to have been previously scalded and rinsed out with permanganate of potash, literally stank. After testing with some concentrated solution of silver nitrate, I told him to have all he required boiled and permanganated, and then made into tea. This made an excellent strong brew and was freely, if not greedily, drunk. No one complained, and there were no ill effects; the following morning the man who had died was buried outside the camp in the usual way. Three volleys were fired and the "last post" sounded.

Our next march started at 6 p.m. the same evening, when we had to go in single file most of the way. The serious cases were carried in doolies and the slight ones on camels. The march, which lay over dry nullahs, was carried out in darkness, and took four and a half hours. No men fell out.

We were now in camp at Lahej, the headquarters of the Sultan of the Abdali. During the next day, while we rested, it was very hot, with sandstorms blowing. I had now only five of my Arab doolie bearers left, the remaining twenty-three having bolted, and twelve camel-men with their camels had also run away. The political officer who was with us told me he would get the Sultan of Lahej to replace these by the following morning. A hospital assistant and four hospital tongas arrived with a convoy to form a kind of permanent rest camp in the guest house here—such as it was. They had come by a longer but less hilly road. At 5 p.m. we struck camp, ready to march off the following morning. I transferred ten sick to the care of the hospital assistant, and left

instructions that they were to be returned to Aden as soon as he thought fit. One unfortunate artilleryman died from heatstroke while on his way back at night. We rose very early, and presently my lost doolie bearers and camels were replaced. Twenty-eight Arabs were sent me—the extra ones in case some ran away again. Still I hoped for the best.

We left camp at 5.45 a.m. to march to Hait-al-lim, six miles away. The path was not good; it lay at the side of a small muddy river, with here and there a hedge and an occasional green field. We had much difficulty in crossing odd ditches, which were great obstacles to the camels, as they so readily slip on mud and roll over. We arrived at our destination at 10 a.m., and after resting during the heat of the day, and returning three sick to Aden, we resumed our march to a place called Shaki, eight miles distant, where we encamped on an undulating rise of hard sand. The water here was clear, and obtained from a well bordering on a native village. Needless to say it was boiled and permanganated before being used.

We remained here till 2 p.m. the following afternoon, when it became necessary to move on to Nob-at-dakin.

The march was a hot, trying one—first across sand, and then over dry, hard, black rock. Forty men at least of the European troops fell out, and all doolies and camel saddles were again full. I congratulated myself on being only six riding camels short, the men, as usual, having run away with their camels, leaving their saddles with us, which now had to be carried as baggage. I had two serious cases of heat-stroke, one of whom died shortly after falling out. The other one's condition was aggravated by several of the Arab doolie bearers gathering round him like flies, dancing, singing, and shouting as if burying one of their own dead. The poor fellow in the doolie when I got to him was delirious, kicking and screaming; after treatment, however, he recovered. He was one of the several cases to whom I had administered a little coca wine. I had brought a few bottles with me to try, and had found it most efficacious. We were now about 300 yards from the river, and 80 feet above it, and on its left bank. To the eastward, about half a mile off, were the high, dark, arid, hot-looking mountains so frequently seen in these parts; and on the other side of the river, to the westward, only further off, were similar mountains.

We arrived at our destination about 5 p.m., and soon pitched a hospital tent. The majority of the sick suffered as usual between sunrise and sunset; towards evening most of them would recover.

On account of the trying march every man was allowed a tot of rum. The man who died on the march was buried at 7.30 the same evening.

The nights were now getting cool, and were very refreshing to anyone who had not been out of Aden for a couple of years.

I was much relieved to find that Lieutenant Hall, R.A.M.C., had arrived by forced marches to assist me. He brought with him a few camels, with chairs slung across their backs to be utilized for the sick.

At this camp two men got bitten by camels, one through the arm, and the other through the hand. I only mention the fact as the general idea is these animals tear when they bite. The wounds were clean, punched-out holes one could get an ordinary lead-pencil into, that in the arm being about two inches deep. One man had three such holes and the other two. They all healed up, with scarcely any inflammation, granulating up from the bottom and giving no trouble.

It was now July 21, and at 4 p.m. we struck camp and marched over country of lava and granite formation, crossing an occasional nullah; hills were still around us, and there were no shrubs or verdure; the river-bed here was about 100 yards across, and winding tortuously through it was a shallow, running stream of somewhat muddy water, some seven yards across. It was always astonishing to see how stragglers would pick up and join the ranks when they saw a little water.

In a couple of hours we arrived at Jol Madram after a comparatively easy march. We encamped near the river and had delicious bathing in some real fresh water, a little muddy, but that did not matter. Imagine the luxury, when you think that during our confinement in Aden for two years we had nothing but distilled sea-water to wash in.

The following day, at 4 p.m., we struck camp and marched off. Previously to doing so I found two of my camels missing. We were too far up country now for anyone to risk leaving the column, so that I knew they were not far off; at the same time, if lost, they could not be replaced without great delay, as none were procurable near here. The matter interested me a little at the time, as I had painted on all my camels' necks the letter "H" in Condy's fluid, and was rather curious to see if the culprits had possibly managed to rub it out. When we arrived at our next camp—Habel Masseba—after an eight-mile march, we bivouacked, and here, whilst making inquiries about the lost camels and walking round camp, I found them in the Commissariat lines, with the "H's"

fairly distinct on their necks; I brought the criminals to book, and they admitted having tried to obliterate the "H's," but could not manage it.

Every one now wanted to brand their camels, but "I had run short of 'Condy'!"

An incident happened near here which nearly cost each of us a meal. Our contractor, who lagged behind a little too far from us, arrived, complaining that all his camels, tables, chairs, food, &c., had been taken from him by natives, who had attacked him. We sent out the "Catch-em-alive-o's"—in other words, the Sultan of Lahej's troops—whose wish it was to accompany us, to see if they could find out what had happened: they came across everything in a nullah, where they had been deposited by the contractor, who imagined the enemy were close on his heels. Anyhow, we got the food, had a pleasant sleep, and started off next morning at 5 a.m., marching about two and a-half miles an hour.

We now ascended a defile, between two ridges of mountains sparsely covered with shrub. It was stuffy and hot, and after winding in and out we got to a place where a good view of the surrounding country was obtained. Away in the distance were high mountains, and appearing half way across, but in reality only about one-tenth of the distance, on an elevated plain a little above the river were to be seen little white dots, the tents of the Arab troop. We descended to the river-bed and afterwards arrived at a really most delightful spot. Here the river was shallow, with a stony bottom, its banks were covered with short, fine and fresh grass, quite like an English lawn; here and there was a clear spring of crystal-like water coming up—oh, dear, such a change for every one! *Jawari* was plentiful, which together with the tropical plants and trees gave the place a most refreshing appearance. After a short ascent, then descent, we came to another cultivated spot, and proceeding further along we rose 150 feet, finally reaching our camp—Mussemir.

It lay on a plateau, and afar off on two of its sides were mountains which may have been 4,000 or 5,000 feet high, we being now nearly two thousand feet above the sea-level. Beyond, the country was open and rugged, and from fifteen to twenty miles away could be seen the ridge of very high mountains which just lay in Turkish territory, and to the westward was the river. The climate was fairly invigorating and the air cool, although the maximum temperature averaged 90° F., and the minimum 79° F.

We now began to take things more seriously, the country beyond being distinctly unsafe. All the troops were fit, and only one man

was in hospital. My first object was to get good drinking water, so donning my revolver I proceeded with an armed escort to search for it. About half a mile out of camp I discovered a spring coming out of the hill-side; the water tasted a little earthy, but after permanganating it we used it for our camp.

We returned to camp and then went to the river for a bathe, taking care our revolvers were close at hand. After all, one is not much of a target whilst bathing, as only the head need be exposed, and if that is hit you are probably none the wiser. Nearer camp most of the men were washing.

We were now well into the Haushabi country, in which the tower of Ad Dareja had been built.

It was a novel sight to see the Haushabis meet Lahej's men. They were not the greatest of friends; still, they sang and danced, rode round and round each other, Lahej's men following their commander-in-chief (as they called him) for all they were worth. He was a worthy old man, a good horseman, and mounted on a splendid white Arab steed. One moment they were firing volleys into the air, regardless where their bullets fell, at another time tom-toming for all they were worth. The noise only ceased in the evening, when they were told to stop.

The Sultan of the Haushabis came into camp to consult me and said he had noises in his inside. After examining him and consulting his minister I concluded he was suffering from excitement and funk, so put him into a peaceful slumber.

The following day, July 24, we began to prepare ourselves for taking the offensive, as our objective was but twelve miles away. I weeded out twenty-five men who could manage to form a guard over the camp we should be leaving behind, and which was to contain most of our belongings, as we intended to move out as a flying column. I distributed the first field dressings, two hundred in number, the West Kents getting eighty, Indian regiment eighty, Artillery thirty, and Sappers and Miners thirty, the remainder being a reserve. A captain of the Indian Medical Service with an assistant surgeon now arrived from Aden in the nick of time, bringing with them eight sleeping kajawahs, two pairs of strong wooden chairs fitted for camels, three riding camels saddled, and tents, two E.P., two 160 lb. and one 80 lb. Each pair of kajawahs was carried by one camel and held two lying-down patients. There were two different patterns of these, the one shown in fig. 1 having an iron framework fitted with corded netting, and that in fig. 2 consisting of a strong wooden frame

similarly fitted. The latter had awnings which were discarded as useless and in the way. It was hard to choose which was the better pattern. The chairs also consisted of strong wooden frames with netting, and a footrest, as roughly shown here, fig. 3, each chair carrying one sitting-up patient. The officer in charge of these had orders to return with all the sick and do duty on the lines of communication, but as there were no sick to return just now I detained him as being more useful to me on the spot. The R.A.M.C. officer and myself, with an assistant surgeon and hospital assistant, three pairs kajawahs, seven doolies and nineteen riding camels were to move off with the flying column. By this arrangement I had enough accommodation for fifty-one sick, i.e., for 9 per cent of the whole force. The tents I took were ample for

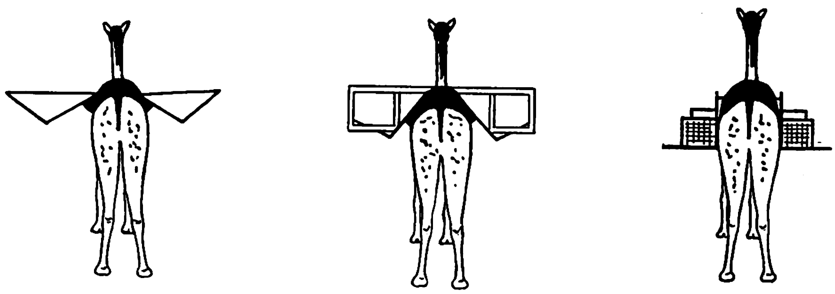

Fig. 1. Fig. 2. Fig. 3.

forming a dressing station, and a section of a field hospital if necessary, and the I.M.S. officer with a subordinate was to be left at Mussemir, where we now were, to look after the temporary base hospital that I had formed. Arrangements were also made to strike it at once if necessary. Tents which were to be taken were struck at 6 p.m. ready to start off the following morning for a place called Mileh, within striking distance of Ad Dareja, and seven miles from here. We got up early and marched off at 6 a.m., arriving at Mileh at 9 a.m. The march was more or less uneventful. No men fell out. No Arabs were to be seen, save those with us, and the country was bare, rugged, full of nullahs, and surrounded by the dark precipitous mountains which I have previously spoken about. The march had to be done in single file, the hospital transport following in the wake of the Artillery, except one saddle camel and two kajawahs which were for the use of the baggage column and its escort. The configuration of the country and the possi-

bilities of being spread out in action necessitated my signalling for the I.M.S. officer to join the flying column and leave the assistant surgeon in charge at Mussemir; then, if there happened to be many wounded a medical officer could accompany them back and remain at Mussemir. He arrived shortly afterwards. We were now only five miles from Ad Dareja. Our camp was near the river on high ground, more or less a hillock. On this we entrenched ourselves.

The entrenchments were dug-out ditches, with entanglements of shrub outside. In the afternoon the political officer and the officer commanding went out with an escort and viewed the surrounding country, getting in sight of Ad Dareja, where they could see preparations for resistance being made. They then returned. The following morning at 5.30 we left our position and marched to within a mile of the position we intended to take, which was about three-quarters of a mile from the tower itself. All baggage, camels, &c., that were not absolutely required were left in a large nullah, 300 yards in the rear. After a conference the officer commanding decided upon attacking and trying to take this position—a saddle-shaped hill on the far side of some flat ground sparsely covered with bushes, and about 1,500 yards distant from our right front, on which we could see the disturbed enemy (Arabs as we supposed). This hill commanded the village of Ad Dareja and the river below, both being on its left as we advanced, and another 1,500 yards beyond the village, on a hillock, stood the tower that had occasioned all the trouble. There was nothing imposing about the building; it appeared to be an ordinary large square block and nothing more, but alive with human beings. We sat down and ate a good breakfast. It was 10.30 a.m. when the repast was over, and up till now it felt like being out for a picnic. The attack was to commence at 11.30 a.m. I now occupied myself in pitching my dressing station behind a well covered-in position, and decided with the officer commanding where the advanced collecting and dressing stations were to be located.

The dispositions of the troops were thus: The West Kents were to advance on the right flank in extended order, taking all the cover they could, whilst being covered by the Artillery at 1,500 yards' range. The 5th Bombay Infantry on the left flank, supported by the Aden troop, with the Sappers and Miners in reserve. The native contingent, numbering about 150 men, we thought were in a place of safety for firing, but as soon as their fusillade commenced it had to be stopped, as their bullets began dropping amongst us. Lieutenant Kirkday, I.M.S., was placed in charge of

the Indian troops, and Lieutenant Hall, R.A.M.C., in charge of the West Kents, whilst I, besides looking after the movements of collecting and dressing stations, remained with the R.A. Punctually at 11.30 the Artillery were ordered to open fire. The first gun made an excellent shot, the shell bursting, after striking the wall of a small, square building on the right of the saddle-back hill. It stirred up the enemy, who now began to run about like flies. Gun after gun went off, the majority of the shells landing where they were expected to, an odd one occasionally falling short or going beyond. The Infantry advanced steadily, and after about twenty minutes the R.A. limbered up and crossed the broad, deep nullah from behind and above which they had been shooting. They advanced to within 800 yards of the enemy, who never retaliated. It was only when the Infantry had got within 500 yards' range that the enemy replied, which we all thought curious, as an Arab will fire at anything 5,000 yards off if he gets a chance.

Firing now began to get brisk on both sides. The collecting station in charge of the Assistant Surgeon was brought forward, and placed behind some rocks, a short distance in rear of the Artillery, the dressing station, which was in charge of a hospital assistant, being advanced and placed in the nullah the R.A. had crossed. My white pony and flag, over the collecting station, seemed marks for the enemy, so I soon took the latter down, and placed the pony under cover. The more we advanced, the heavier the firing became. The bullets began flying in all directions, striking the ground about us, and ricocheting right and left, making weird noises as they did so. So far we were pretty lucky, the bullets seeming to strike everywhere but in the right place. The West Kents, one could see, were getting to close quarters, arriving at the foot of the hill, which they gradually ascended very pluckily, availing themselves at all times of cover. The 5th Bombay Infantry had advanced well on the left, and the Artillery had got up on an elevated position just under the hill, behind some small stone buildings. The firing now was very heavy, and we were on, practically, three sides of the saddle-back hill. The West Kents arrived nearly on the summit when the order was given to fix bayonets and charge, which they did to their credit. Doolies and stretchers could be seen freely going about, and my collecting station was run up into the sheltered position occupied by the Artillery, the dressing station being advanced to the position previously occupied by the collecting station. The village of Ad Dareja, consisting of small, straw, conical-shaped huts, built on a rounded

elevation of ground, had been vacated, the 5th Bombay Infantry having passed through it. Not an Arab was to be seen. The firing of the Artillery from their small seven-pounders was very effective. I saw two shells planted clean through a sangar, 1,000 yards off on the other side of the river, bursting exactly where they were expected to, just under a tree where several of the enemy were, who had been harassing us with their fire. Many must have been killed. Sometimes these little weapons were a little obstreperous, rebounding several yards and turning completely over after being fired. I could not help noticing a camel being struck by a bullet in the buttock. He appeared to think his master had struck him, so turned round his head with a loud howl to resent it. The poor brute bled profusely, but I heard afterwards that the bullet was successfully extracted. My time was now taken up with the wounded who were being brought in. My first patient was a man with a wound of the head, then came one of the West Kents with a bullet wound of arm, and a good deal of hæmorrhage, then a serjeant with a compound comminuted fracture of the thigh, who was pleased to think he "had loosed off seventy rounds at the niggers" before he was hit. One of the 5th Bombay Infantry was carried in, having been shot through the heart, and after him a subahdar of the 5th Bombay Infantry shot through the upper lip. For some time I could not find the wound of exit in this man, who was dead, but subsequently found it near his fifth dorsal vertebra. A jemadar of the Sappers and Miners was the next brought in. The poor fellow, who had been shot through the stomach, felt he was dying, and begged me to try and keep him alive until his captain arrived, in order that he might make arrangements for his family to be looked after, but he died almost immediately. Then came a man of the West Kent shot through the head, and others.

We had been fighting four and a half hours and the firing still continued. Time went wonderfully quickly. Lieutenant Hall, R.A.M.C., brought down his last wounded man, and on asking him how he was getting on, said, "This is all I got," taking off his helmet and showing me where a bullet had gone through it, severing his chin-strap, which at the time was underneath his chin. It happened whilst stooping over and attending to an officer. I congratulated him on his narrow escape. The enemy had now descended the opposite side of the saddle-back hill, which was fairly precipitous, and was being shelled by the Artillery, when clouds came over, and soon it became very dark and thundery. It now started raining, which gradually put a damper on the firing. Sniping

continued, which was only put a stop to by a severe thunderstorm; rain fell in torrents, soaking us all, and darkness setting in necessitated our entrenching ourselves in our new position on the hill. We had been at it five and a half hours, during which time the 5th Bombay Infantry alone had fired off 4,700 rounds of ammunition. I now busied myself in pitching tents for the wounded. It was a difficult task, as the wind was blowing a gale and the rain falling in sheets. The dressing station had been brought in. Wounded from the enemy and prisoners began to arrive, the first of whom suffered from a wound of the radius and ulnar. His feet were temporarily bound and he looked down on his luck. Others arrived and were similarly bound. They were all hardy, cut-throat looking fellows of splendid physique, and looked brown and weather-beaten. It was 7 p.m. and each of our men was given a tot of rum, which had been well earned, having been out eight hours in a burning sun, afterwards getting wet through. The Political Officer now sent in an ultimatum to the tower, about 1,500 yards distant, informing those there that if they did not surrender by eight o'clock the following morning, the tower would be attacked and blown up. No reply was forthcoming as the messengers returned, stating everyone had left the tower and no one was to be seen. Placing no reliance on this, we bivouacked inside our entrenchment during the night. The stench was awful. We were told that 2,000 Arabs had been living about these parts for the last two or three months, and as their sanitary arrangements were evidently of an antiquated type, one can well imagine the offensive odours. We buried our dead, and remained unharassed during the night; so next morning we marched off to attack and blow up Fort Ad Dareja, starting at 8 a.m.

From accounts now received, we expected severe fighting. The main body moved off and crossing the river below, they marched in three columns, northward, to attack the tower. The R.A. with four guns occupied a ridge running nearly north and south. The West Kents were on the left flank, and the 5th Bombay Infantry on the right. One company of the West Kents was in reserve behind, and two guns and one company of the 5th Bombay Infantry, that had not crossed the river, advanced with us. All along the river banks were built sangars which had been vacated, so that evidently the enemy expected us to march along the river-bed.

Having taken up our positions, we now awaited results, and sent forward some of our native friendlies, the Haushabis, with

red flags in order that we might recognize them, to see whether the tower had been vacated. Presently, on the top of the tower, we saw them wildly delighted, waving their flags. It was now the Royal Engineer officer's turn. He advanced cautiously, and on gaining the tower, which was on a rounded elevation, occupied himself for about twenty minutes undermining it with 75 lb. of gun-cotton. Setting light to the fuse, he and his partly quickly retired, and in another ten minutes, explosion after explosion occurred, and amidst ringing cheers from the troops, the tower was levelled to the ground. Our object had been accomplished. We left smouldering what remained of the building, and retired to our camp, bringing with us a few prisoners we picked up in the bushes and who had been out all night in the rain. These informed us that we had been fighting an advanced party of over 400 men, and directly the main body of about 14,000 men found we possessed "big" guns, they retired some twelve miles to the slopes of the high mountains beyond.

On arrival in camp, where the stench was as bad as ever, two more wounded were brought in. One had a compound, comminuted wound of the thigh, and the other, a bullet wound of the ankle, through which I could pass my finger. They acquainted us with the fact that directly Mohammed Bin Nasir Mukhbil saw our first shell burst, he and his wives left the tower hurriedly, exclaiming, "They had never seen a gun fire 'both ends' before," evidently referring to the shell bursting. I now put the man up in splints, which took me over half an hour. When my back was turned, he ripped off the bandages and discarded the splints, not seeming to care an iota about anything or anybody. This is only an example of what they were all like. Their food consisted of milk and lime-juice, they smoked cigarettes, and occasionally ate pieces of chocolate. Their habits were very dirty, and it was with the greatest difficulty I could get them to wash and keep any clothes on. Several corpses lay about, and after they were buried the Officer Commanding and myself inspected the camp, and we decided, as we might probably have to remain in these parts a week, to move our camp, the following morning, to a more sanitary spot. After attending to the sick, we spent a comparatively quiet evening, and retired to rest.

The following morning we went to our new camping ground, close by, but below and nearer the river-bed. The water supply was ample and good. At the spot where it was obtained, it had been filtered through 200 yards of the river-bed sand, a guard being placed over it. I recommended that everyone should have two

issues of lime-juice a week, and that the Indian troops should have two issues of potatoes a week, instead of onions. Rinderpest now broke out in camp, so we had to slaughter and afterwards burn most of our bullocks, consequently we were placed on tinned meats.

The following day Captain Kirkday, I.M.S., accompanied eight wounded prisoners to Mussemir, with orders to inform me each day as to their progress. This was better than returning them all the way to Aden at once, as the few days' rest would prepare them for their long, jolting journey of seventy miles; besides, in Aden open wounds take a long time to heal, and further, we knew our cases and possessed all the necessary instruments for amputation, if necessary. Of course if we had had more fighting and more casualties we should have probably had to return them to our proper base at Aden. Just now 24 regular doolie bearers, 11 kajawahs, and 4 doolies arrived from Aden, so that I had ample transport. This extra transport would have been very necessary had we had further casualties, but as it was, it was not required. As a matter of fact, we considered ourselves most fortunate in not having all being annihilated, which would have been the case had the enemy stood their ground, for they considerably outnumbered us, and they are a plucky, determined, hardy lot of fellows. Things now went smoothly. We remained in camp eight days, nothing eventful happening. Besides attending to the sick and wounded, I passed the time shooting green pigeon, and making a sketch or two. Lieutenant Hall, R.A.M.C., left for Aden, where he was required, the Senior Medical Officer being on the "sick list." On August 3, we were to leave camp for Mileh, seven miles off, but the torrents of rain delayed our departure till the afternoon. We arrived at Mileh 6 p.m. Here the temperature was 69° F., the lowest we had been in for two years. The following morning we left for Mussemir, arriving 9 a.m. The sick and wounded were all doing well. I now collected all my camels, numbering sixty-seven; and next day my time was taken up attending to the sick, and arranging for their transport, selecting cases for dandies, kajawahs and riding camels, as we were to move off during the night for Jol Madram. The Aden troop and a company of Indian Infantry were to remain here, encamped, till further orders.

When the time arrived for us to depart, it rained so heavily I was unable to move all the sick, or to strike their tents, and as there was no great urgency, I marched off independently at 4.15 a.m., arriving Jol Madram 9.15 a.m.

Next morning we marched to Nob-at-dakin. Nothing of interest happened. The sick were gradually diminishing; the temperature ranged between 78° and 97° F. In the afternoon I went out with my gun and unexpectedly came across some very fine chikor, several of which I bagged.

Our next march was to Shaka. We now got back into the sandy country, losing all the stony ground. The river was very muddy, which did not prevent the men bathing.

At 5.30 the following morning, we left for Bir-am-laifi and the next morning moved on to Bir Maghafa, thus striking a different direction to the one we took on our outward march, and which had proved so unfortunate. The going was easy, but the country rather broken, and crops, such as they were, growing. As we passed near Lahej, I galloped over there, and struck the base hospital, telling the hospital assistant in charge to move on to Sheikh Othman. I then rejoined the troops at Bir Maghafa.

We marched off the following day, bivouacking the night at Fiyush, and arrived at Sheikh Othman at 9 a.m.

It was now August 11. We had 24 sick, 14 of them lying-down patients, which we placed in the Civil Dispensary. It was quite refreshing to see them in beds with clean sheets. The General and P.M.O. were there on our arrival, and after attending to the sick, I took them round for inspection.

The weather was intensely hot, dust-storms blowing, and it was impossible to keep the sand out of our tents, baths, and even mouths. We must have swallowed a lot, still it acted, no doubt, as a corrective.

The following day our force broke up and we marched independently into Aden. I started, with my string of camels, at 5.30 a.m., and at the Isthmus position my sick were divided into two batches, one, the Indian, going with Captain Kirkday, I.M.S., into the Crater to be treated there, whilst I took the remainder to Steamer Point.

Thus ended the expedition, and one that had been most instructive, interesting, and enjoyable to all who had the luck to be with it, and it is interesting to note, although we had several losses on the march out, not a man died on the way back. The going was very slow over eighty miles of rock and desert, during the worst time of the year, the transport consisting of camels and dandies.

A week after our arrival only the surgical cases remained in hospital; they, in due course, were sent back to their regiments.

with the exception of one or two whose wounds made them inefficient.

General Résumé.

The following is a general résumé of the medical history of the expedition, forwarded by me to the Principal Medical Officer, Her Majesty's Forces in India, on the termination of the operations:—

(*a*) *Composition of the Force*:—

Strength	R.G.A.	81
	1st R.W. Kent Regiment	210
	Bombay Sappers and Miners ...	80
	Aden Troop	40
	5th Bombay Light Infantry ...	260

A hospital equipped for twenty-four beds on the Scale, Appendix 33 and 34, Army Regulations, India, vol. vi, and sick transport for eight lying-down and thirty-two sitting patients. The former were carried by dandies and the latter by camels which were equipped with riding saddles. These were supplemented later on by riding chairs and kajawahs, which were made up and sent out.

(*b*) *Physical Geography, &c.*—The country is a desert. For half the distance to Ad Dareja, sand and shrubs; and the other half, rough, undulating country, hard and stony, surrounded by hills of hard rock of volcanic origin. A small river ran from Lahej to Ad Dareja. We followed the course of the river over ground more or less undulating, with here and there nullahs. Every seven miles or so we would come across a native village.

(*c*) *Vegetable and Animal Products.*—Practically *nil*. There is very little vegetation along the river banks. Within thirty miles of Aden there is some vegetation, jowari is plentiful around Lahej, so are dates and coco-nuts, sweet potatoes and native vegetables are also known. Six miles farther on vegetation is *nil*, so that without supplies an army would soon starve.

(*d*) *Climate.*—Heat most trying from 9.30 a.m. till 3.30 p.m., more especially on the sandy plains, where it is fatiguing and depressing. As one gets more up country the breeze gets cooler during the day, and at night we have been known to use blankets. The temperature ranges from 69° F. to 106° F. in the shade, 102° F. was of common occurrence at noon and 78° F. at night. The air is comparatively dry. Sixty or seventy miles from Aden it thundered and lightened and rained nearly every other day at 5 p.m. most regularly. The wind first got up, then rain fell for a couple of

hours, drenching us all through. One night at Ad Dareja it rained in torrents from 2 till 6 a.m.

(*e*) *Principal Diseases.*—The sun accounted for most of the sickness, principally exhaustion, heat-fever embraced every variety from the so-called ambulant to the most fatal forms, vomiting and fatigue were quite common, but usually disappeared by the following morning. Severe cases of heat-stroke at the commencement were comparatively common. Several men suffered from looseness of the bowels, doubtless attributable to the changed condition of life, but quite compatible with good health. After this there was a period of constipation, which perhaps lasted a day or two. There were a few sporadic cases of dysentery amongst Indian troops, especially at Ad Dareja. The men themselves attributed it to the water, which as it happened was particularly good there.

(*f*) *Wounds.*—All gunshot, made mostly by rifle bullets.

(*g*) *Rations.*—As per Field Service scale. A pound and a quarter of meat was issued daily to British troops; biscuits were issued sometimes in lieu of bread, and as an extra. Chocolate, lime-juice, potatoes and onions formed part of the rations. Indian troops were also fed according to scale, and got extras, such as lime-juice and potatoes. The Artillery and West Kents each had their own coffee-shop, where men could get what they wanted. The flour would have been better had it been kept under a waterproof, to prevent rain from getting into it.

(*h*) *Spirits, &c.*—Rum, freely diluted, was issued on my recommendation on four occasions, principally after hard marches, and getting wet through.

(*i*) *Medical Comforts.*—According to Appendix 34, vol. vi, and supplemented by coca-wine I brought out, which proved extremely useful, serious cases frequently recovering almost at once after a wineglassful.

(*j*) *Clothing.*—No Field Service kit was issued, the men using their ordinary khaki uniform. The O.C. West Kents supplied his men with pith helmets and spinal pads. The regimental helmets would not have been a sufficient covering for the head. They do not shade the temples sufficiently. The Artillery had a better pattern helmet.

Echoes of the Past.

A SHORT HISTORY OF ENGLISH MILITARY SURGERY AND SOME FAMOUS MILITARY SURGEONS.

By JAMES YOUNG, M.D.

The earliest evidence we have of the wounded in battle receiving skilled treatment is obtained from Homer (B.C. 1250). Machaon and Podalirius, sons of Æsculapius, were the physicians of the Greeks in the expedition to Troy. It was the former to whom Homer referred when he wrote:—

> "A wise physician skilled our wounds to heal
> Is more than armies to the public weal."

Surgery was the chief business of the physicians in those days. "They cut or drew forth darts, swords, and lances, checked the hæmorrhage, washed the wounds with tepid water, applied bandages, afterwards sprinkling them with soothing drugs, and in addition administered a restorative drink. There were no stationary or movable field hospitals, but the soldiers' tents or barracks took their place, and possibly also served for the reception of the wounded or the sick" (Baas's "History of Medicine.")

But Machaon and Podalirius were not only army surgeons, they were also warriors in the fray, and were accordingly placed upon complete equality with other combatants:—

> "Full thirty sail the sparkling waves divide
> Which Podalirius and Machaon guide."

We have no record of military surgeons, as such, in England, earlier than the thirteenth century. Yet England was the first to originate something like an army medical service. When Prince Edward invaded Scotland (1299-1301) there were attached to his army no less than seven medical men. "They included a King's physician and two juniors, a King's surgeon and two assistants, and a simple surgeon. The King's physician and surgeon each received a knight's pay, two shillings a day; and the others, who ranked as esquires, one shilling a day" (Meynert). The relative rank of military surgeons of this period as estimated by their salaries, may be better judged by the following account of the pay received by the English army at the Siege of Calais in 1347: "Prince of Wales, one pound a day; Bishop of Durham and

thirteen Earls, six shillings and eight pence a day each; Knights, two shillings; Esquires, one shilling; mounted archers, sixpence; Welshmen, fourpence; archers on foot, threepence" (Meynert). That the surgeons in the army of Prince Edward found plenty to do, is indicated by the fact that the chief surgeon received compensation "for three horses killed in Scotland on the King's service."

But the development of this early medical service appears to have been slow, for we have no record of military surgeons during the wars of Edward III, except that the Welshmen who fought at the Battle of Crecy were accompanied by one of their own nationality.

It is not until the beginning of the fifteenth century that we can again trace the progress of military surgery, in the names of Thomas Morestide and Nicholas Colnet, who were respectively surgeon and physician to the French expedition of Henry V, and were present at the Battle of Agincourt in 1417.

Morestide seems to have been the surgeon-in-chief to the expedition, though Colnet must have held high rank also, which probably accounts for the high pay which they both received (£40 per annum). To this sum was added twelve pence a day for subsistence, while their assistants received £20 a year and sixpence a day subsistence. They were also allowed a share of the prisoners and booty. Of the proceeds of the booty the surgeons were expected to give up one-third to the King, together with all precious stones, gold and silver, in case the sum total of these exceeded £6; a lesser sum or the residue, however, belonged to themselves. Another surgeon, William Bredewardyn, seems to have been afterwards associated with Morestide, and they were allowed two wagons and a chariot for their baggage.

It was the influence of Thomas Morestide that procured for the Barber Surgeons their charter in 1461.

The name of John Arden, or John of Arderne, must also be mentioned as associated with military surgery at this period, for he, too, served as an army surgeon in the French wars. Allbutt says, though "Arderne was probably a better surgeon than Gilbert or John of Gaddesden, he is little more than a name."

Military surgery of the sixteenth century is represented by Thomas Gale (1507-1586) and John Woodhall (1569-1643). The former was an eminent army surgeon under Henry VIII and Elizabeth. He published in 1563 "An Excellent Treatise of Wounds made with Gunshot," in which he opposed the then prevailing opinion that gunshot wounds were "poisoned," and advocated

simple treatment. He further advised that if a ball has so entered the body that there is much difficulty in reaching it, it be left there rather than cause "mortal accidents" by the surgeons searching and probing. Eleven soldiers shot in the body and thus let alone by him on service in 1544 did well.

At this period the inferior surgeons in the army were often impressed into the service, and their pay in 1514 was sixpence to eightpence a day, the same as an archer. The character of the surgical talent obtained by this munificent pay may be learned from Gale's description: "I remember when I was in the wars at Montrieul (1544) in the time of that most famous Prince Henry VIII, there was a rabblement there that took upon themselves to be surgeons. Some were sow gelders and some horse gelders, with tinkers and cobblers. This noble sect did such great cures that they got themselves a perpetual name; for like as Thessalus' sect were called Thessalions, so was this noble rabblement for their notorious cures called dog-leaches; for in two dressings they did commonly make their cures whole and sound for ever so that they neither felt heat nor cold nor no manner of pain after." The dressings used by this "rabblement" was "a pot or box wherein was such trumpery as they did use to grease horses' heels withal, and laid upon scabbed horses' backs." But in the end "this worthy rabblement was committed to the Marshalsea and threatened by the Duke's Grace to be hanged for their worthy deeds" (Handerson-Baas's "History of Medicine").

In the latter half of the sixteenth century native English surgeons seem to have been scarce, for again Gale says: "I have myself in the time of King Henry VIII holpe to furnish out of London in one year which served by sea and land three score and twelve surgeons which were good workmen, and well able to serve and all Englishmen. At the present day" (when he wrote, say 1586) "there are not thirty-four of all the whole Company of Englishmen, and yet the most of them be in noblemen's service, so that if we should need I do not know where to find twelve sufficient men. What do I say? Sufficient men? Nay I would there were ten among the Company worthy to be called surgeons" (Handerson).

Woodhall, at the age of twenty, served in the expedition sent by Elizabeth under Lord Willoughby to render assistance to Henry IV of France. He settled in London in 1603, and was shortly afterwards appointed Surgeon-General to the East India Company. In 1616 he was elected surgeon to St. Bartholomew's Hospital, and served as Master of the Barber Surgeons' Company in 1633.

The great Elizabethan glory shed little of its light upon the profession of medicine, and in Richard Wiseman (1595-1686), the "Father of English surgery" (as Paré was the "Father of French surgery"), and the great representative of the surgeons of the Commonwealth, we have, as Allbutt puts it, "A bridge of a single plank between the Stuarts and the great eighteenth century school of Cheselden, Pott, and Hunter." He first appeared as a surgeon in the Civil Wars during the reign of Charles I. He was present and taken prisoner at the Battle of Worcester, and took part also at the fights at Musselburgh, Taunton Siege, and Weymouth. He was in the service of all the Stuart kings, from Charles I to James II, and was appointed serjeant surgeon to Charles II in 1661. His published writings deal with a variety of subjects, and they embrace the greater part of the surgical learning of his day. According to Haesar: "He favoured primary amputation, especially in gunshot wounds of the joints, and treated aneurism by compression." Though acquainted with the practice of ligation of vessels to control hæmorrhage, he thought it required "too much light and too many assistants to be ordinarily used in battles on sea or land." He preferred the use of the "Royal Styptic," and always had the actual cautery in readiness for use, if required.

No standing army existed in England before the Restoration and that of Charles II scarcely exceeded 5,000 men. Our information as to the position and pay of medical officers at this period is very scanty, and it is not until we come to Sir John Pringle (1707-1782) that we can trace further the progress of military surgery. The advancement of army medical affairs in the eighteenth century was rapid and proportioned to the improvements in surgery and surgeons and the demands of an improved system of warfare. Pringle was in 1742 appointed physician to the Earl of Stair, who then commanded the British army on the Continent, and through whose influence Pringle was also appointed physician to the military hospital in Flanders. His commission provided that he should receive a salary of twenty shillings a day, and be entitled to half pay for life. In 1752 he published his "Observations on the Diseases of the Army." It is generally believed that it was due to his influence and suggestion that the neutrality of field hospitals was recognized for the first time in the history of British warfare, for when the English army was encamped at Aschaffenburg in 1743, Lord Stair and the Duke de Noailles, who commanded the French army, mutually agreed "that the hospitals on both sides should be considered as sanctuaries and

mutually protected." Pringle continued to serve under the Duke of Cumberland as Physician-General to the forces in the Low Countries and as physician to the Royal Hospitals in these countries. In 1745 he attended the forces sent to deal with the Scottish rebellion, and in 1747 and 1748 he again accompanied the troops abroad. After the conclusion of the treaty of Aix-la-Chapelle he finally established himself in London, where his connexion and active interests soon raised him into extensive practice. His "Observations on the Diseases of the Army" ranks as a classic. The book passed through seven editions during the life of the author and was translated into German, French and Italian—distinctions which were at that period not so easily accorded as at present. Among the important points which he illustrates are: The force which may at any time be relied upon for service; the effects of long or short campaigns upon the health of soldiers; the difference between taking the field early and going late into winter quarters. He proved the indispensable necessity of a free circulation of air in hospitals from observing, amongst other facts, that the sick who were placed in hospitals having defective doors and windows were more speedily restored to health and were less subject to relapses. He also erected barrack hospitals in 1758. He thus laid the foundation of the science of military hygiene, a subject discussed among others in England by Richard Brocklesby (1724-1797), whose experience in the Seven Years' War led him to recommend light wooden shelters for the protection of the sick and wounded in the field.

In 1806 a "Royal Professor of Military Surgery" was appointed in Edinburgh University, the first academic recognition of this important branch of the subject.

The most famous military surgeon of the nineteenth century was undoubtedly George James Guthrie (1785-1856), "the Larrey of England," inasmuch as he accompanied Wellington upon all his campaigns as Larrey did Napoleon I. He was in his time the greatest English authority on military surgery, and was characterized as a surgeon of great "operative ability and modesty." He wrote on various subjects of surgical interest, but his best known work was "A Treatise on Gunshot Wounds, on Inflammation, Erysipelas, and Mortification, being a Record of the Opinions and Practice of the Surgical Department of the British Army at the Termination of the Wars in Spain, Portugal, France, and the Netherlands, in 1814 and 1815." It was published in London in 1827, and went through numerous editions.

Finally, mention need only be made of a few of the celebrated representatives of British military surgeons of the past century: Parkes, MacCormac, Porter, Longmore, and many others to whom the safety of thousands has been committed in the midst of danger, in perilous situations and in unhealthy climates, and whose names, with many others of the present day, are imperishable in the history of British military surgery.

Reviews.

THE ETIOLOGY OF ENDEMIC GOITRE. By Robert McCarrison. London: John Bale, Sons and Danielsson, 1913. Pp. vi. and 296. Price 10s. 6d. net.

This monograph on goitre is an amplification of the Milroy Lectures for 1913, and serves to give an account of Major McCarrison's well known researches, as well as a résumé of our present knowledge of the etiology of goitre. The author shows the predominating influence of water in the production of the disease, and gives much experimental and epidemiological evidence in illustration of its action. Hard waters appear to favour the action of the causative agent, but do not cause the goitre, since the disease may occur in communities who drink rain or snow water. Goitre increases in severity in proportion to the amount of contamination of the water-supply. Ingestion of sediment from a goitre-producing water or of the deposit on a filter from such a water is followed by goitre; if these materials are boiled they no longer produce the disease. Goitre-producing waters are rich in bacteria whilst safe waters in the same districts are comparatively free from organisms. From these facts he concludes that goitre is produced by the action of a living germ. Experiments on goats by the administration of water contaminated with fæces from goitrous persons resulted in the production of enlarged thyroids in half the goats tested. So that it would appear that the causative contamination of waters is fæcal in origin; at the same time there have been no practical results obtained from the boiling of water in endemic areas, possibly, according to McCarrison, because the inhabitants also absorb the infective agent in the course of their work on the soil.

Treatment of goitrous persons with intestinal antiseptics produced improvement in their condition. The administration of thymol, 10 gr. twice daily, resulted in manifest reduction in the size of the goitre in 68 out of 82 cases; lactic acid bacilli also acted well in eight cases in which they were tried. Vaccines were also tried with apparently good results, but here we find some difficulty in following Major McCarrison, since it appears that it does not greatly matter what the "vaccine" is made of; mixed cultures from fæces, coli vaccines, staphylococcus vaccines, and one made from a spore-bearing bacillus, all appear to have produced good results! It makes one suspect that there must have been other factors in the cure of these cases.

The book contains an extensive bibliography of the subject.

W. S. H.

TUBERCULIN TREATMENT. By Clive Riviere and Egbert Morland. Second Edition. London: Henry Frowde; Hodder and Stoughton. Pp. xvi and 247. Price 6s. Oxford Medical Press.

The first edition of this work appeared in April last year, and the fact that this edition was published in December, 1912, is evidence of its popularity. The reason for this is not far to seek when one reads the book. The administration of tuberculin must appear to many an intricate subject, and, doubtless, many are deterred from employing it by the fear of doing more harm than good. Not a little confusion is caused by the opposing schools, viz., that of the large frequent and that of the small infrequent dose.

The authors reconcile these schools on the Wolff-Eisner theory by assigning to each its proper domain in the therapy of tuberculosis. The large frequent dose régime is most useful in cases where the patient is receiving more or less uncontrolled doses of tuberculin by auto-inoculation, as in phthisis pulmonalis, and it is necessary to establish a tolerance to tuberculin. In so-called surgical tuberculosis, on the other hand, auto-inoculation is more or less under control and it is not necessary to establish a tolerance; here is the domain of the small infrequent dose.

A useful account of the more important tuberculins is given, and, for the rest, the book deals in a practical manner with the various forms of tuberculosis and the treatment of each with tuberculin.

A book of such convenient size and of such a practical nature cannot fail to be popular. It will serve an excellent purpose by extending the use of a valuable remedy.

L. W. H.

SURGERY OF THE LUNG. By Garrè and Quincke. Translated from the German by D. M. Barcroft. London: John Bale, Sons and Danielsson, Ltd. Pp. viii and 271. Price 12s. 6d. net.

This book has been written by experts who are dealing with their special subject, and its contents embody the most modern methods employed in the surgery of the lung. In the opening chapters the anatomy of the lung is thoroughly described, and the text is well supplemented with diagrams and plates. The next chapter deals with the pathology of pneumothorax, its use, its control and the dangers incident to the condition.

The methods of maintaining a difference of pressure between the intra-alveolar air and the surrounding air are next described, and Sauerbruch's, Brauer's and Tiegel-Henle's apparatus are figured. The relative merits of an increased internal pressure and a negative external pressure are compared and the conclusion stated that, in the physiological effect, there is certainly a difference between increased pressure and decreased pressure, but when the apparatus is carefully and thoughtfully used it is without importance in practice. The question of the anæsthetic of choice is discussed under the heading of General Surgical Technique, and a preference for the use of local anæsthesia is clearly enunciated.

Chapters on injuries of the lung and pulmonary suppurations follow, and the surgery of pulmonary tuberculosis is exhaustively described. The value of this chapter is much enhanced by the records of experimental results and the reproduction of skiagrams.

The treatment of tumours of the lung and mediastinum is next considered and the use of Brüning's bronchoscope is clearly described. The last chapter is devoted to the subject of emphysema and the surgical treatment of rigidity of the thorax.

The book is copiously illustrated with excellent diagrams and reproductions of coloured plates and skiagrams.

So clear is the English and so accurate the phrasing of this work, that one is apt to forget it is but a translation from the German of a standard record of the surgery of the lung.

J. W. H. H.

AIDS TO SURGERY. By Joseph Cumming. London: Baillière, Tindall and Cox. 1913. Pp. viii and 416. Price 4s. net.

This little aid has appeared in a new edition of 400 pages. It possesses the disadvantages as well as the advantages of all concentrated efforts, but doubtless it will be of much help to those preparing for examination.

In a small space it briefly covers the field of surgery, so that its perusal will at least give to the student a vocabulary of terms used in surgery; whether he understands them or not will depend on his further studies, as he could merely obtain a parrot-like acquaintance with the subject from this condensed aid.

While examinations are conducted on their present lines our sympathies must ever remain with the examinee, and he may well be forgiven for seeking consolation and cram-knowledge in such works as this book typifies.

J. W. H. H.

Current Literature.

Plague Commission.—Seventh Report, *Journal of Hygiene*, Plague Supplement, No. II, January, 1913. We abstract the following items of general interest. Observations on immunity of wild rats to plague show that it is highest in those places which have suffered most severely from plague, and the immunity appears to be transmitted to the offspring. Experimentally it was found that survivors among rats which had been exposed to infection were more immune than control rats. From this we may gather some hope that plague will eventually die out in the present endemic areas, but it is a slow business. Observations on the breeding of fleas showed that it underwent marked seasonal variations, the most favourable conditions being comparatively cool and moist weather, whereas hot dry weather reduced the rate of multiplication and at the same time fleas survived for a shorter period than under conditions of coolness and moisture. Statistics as to the effect of plague serum in treatment show that there is a slight advantage in the case of non-septicæmic cases treated with an anti-serum prepared by injection of nucleo-proteids of plague bacilli. In some experiments on immunization with plague vaccine (whole culture) and plague nucleo-protein it is worthy of note that with the former the maximum protection (in rats) is already established twenty-four hours after inoculation, with nucleo-protein the maximum is attained on the third day; in neither case is there any evidence of an increased susceptibility in the period immediately following inoculation. Five months after inoculation with nucleo-

protein eighteen out of thirty-one rats tested survived a dose of living plague bacilli which was fatal to untreated rats.

Sydney Rowland has some interesting observations on the relations between the pseudo-tubercle bacillus of rodents and the plague bacillus. Morphologically and on culture these organisms are indistinguishable. Rowland finds that whereas the plague bacillus is equally virulent for rats and guinea-pigs, the pseudo-tubercle bacillus is virulent for guinea-pigs and not for rats. Rats are easily protected against plague by inoculation of a plague vaccine, but it is almost impossible to protect guinea-pigs in this way. On the other hand, guinea-pigs can be protected from plague by injection of killed pseudo-tubercle bacilli, a preparation which conveys to rats no immunity from plague.

He concludes that for a bacillus or bacillary product to act as an efficient vaccine it must, in its original condition, be possessed of toxic action for the animal to be protected. By growing virulent plague bacilli in a solution of plague nucleo-protein, Rowland succeeded in producing a strain of plague bacilli which was identical in its pathogenic action with the bacillus of pseudo-tubercle. W. S. H.

Urobilin Test in Tropical Diseases.—Urobilin is peculiar in fluorescing with zinc salts. Urine is mixed with an equal volume of a 1 in 10 solution of zinc acetate in alcohol and is filtered. If urobilin is present the filtrate becomes opalescent. The reaction may be quickened by the addition of a drop of tincture of iodine. Urobilin may be detected by this method when in 1 in 50,000 dilution.

Hausmann (*Deut. med. Woch.*, February 20, 1913, p. 360) recommends Bogomaloff's test, which is simpler than the foregoing.

Twenty to forty drops of a 10 per cent copper sulphate solution are mixed with 10 to 20 c.c. of urine; 2 to 4 c.c. of chloroform are added, and the test tube inverted about ten times without shaking. The chloroform collects at the bottom, and if urobilin is present, is coloured with a yellow tint, the depth of which varies with the amount of urobilin.

Justi states that in tropical diseases the examination of the urine for urobilin is of the same importance as that for albumin. In all of ninety cases of malaria urobilin was found; the absence, therefore, of urobilin would be evidence against a diagnosis of ague. The test is positive in most cases of liver disease, and also in acute infections, such as plague and pneumonia. C. B.

A "Universal Stretcher."—Médecin-Major Dr. Eybert (*Le Caducée*, February, 1913) describes his universal stretcher and its support; this was shown at the International Red Cross Conference, Washington, 1912, and obtained honourable mention at the Feodoronova prize competition.

It was demonstrated to General Lyautey, who was struck with it, and expressed his wish that it should be practically tested in Morocco, where transport difficulties are great. A description of this support appeared in the May number of *Le Caducée*, 1912. No detailed description of the stretcher is given, but its construction may be surmised from an examination of the photographs accompanying the notice.

The poles seem to be of wood of the ordinary length and form. The head-end traverse is in the usual position—a handle length from the head-ends of the poles. It is jointed in the middle, but its two halves are slightly curved in the horizontal plane, the convexity of the curve being

towards the foot end of the stretcher. A long leg (about 18 in.) is fixed to each pole (probably hinged to the pole) which raises the head of the stretcher considerably higher than its foot.

The other traverse is fixed to the leg trough on its under side, and through this to the poles at a point where the knee of a patient would come when he is laid upon the stretcher, about 4 ft. 6 in. from the head end. This traverse is longer than the head end one and is also jointed, the two halves seem to be separable on the removal of a pin. When opened to the full extent it permits the poles to be separated widely enough to allow a patient to ride pick-a-back (see fig. 4, p. 495). A foot to rest upon the ground projects from the joint of the traverse and forms the pin of the traverse joint. The canvas is about 4 ft. long, and is apparently attached by its two head-end corners to the junction of pole and traverse, in such a way as to allow it to be adjusted by slackening or tightening straps.

It is not attached along its edges and at the foot-end it is split up, and the lower corners and the edges of the split show lace holes, which imply the use of strings for its adjustment and fixation.

A trough—probably of sheet aluminium—is attached to the inner side of each pole for a distance of 2 ft. at the foot-end to receive the patient's legs. At its upper end it is probably strengthened by a steel band, which is continued into the traverse.

The upper end of the canvas appears to be made into a bag which may be stuffed with material to form a pillow.

The diagrams show the intentions of the inventor as to some of its various uses.

The *Support* consists apparently of four section girder iron uprights in two pairs, each pair being joined by two crossed diagonals of wood or iron. (See fig. 5, p. 496.)

The two pairs carry two horizontal bars of wood of about 6 ft. length which connect them together at about 2 ft. distance, and they are further fastened by diagonals passing between the feet of the uprights and the transverse bars.

These two transverse bars must be strong enough to bear the weight of a man and stretcher at each end.

The frame so formed is shown in the stretcher placed on a pack saddle and with a stretcher slung upon the projecting ends of the transverse bars. In one sketch a patient on a stretcher is shown as being slung from the top of the four uprights and carried axially over the centre of mule's back.

Both apparatus are very ingenious, and although too much seems to be claimed for them in the way of versatility, they are interesting as embodying new ideas.

Experiments are to be made with them and more will be heard of them.

The inventor has now made his *Support* adaptable to different sized saddles, and with folding cross bars, and adaptable for carriage upon two bicycles or two detached wheels. H. E. R. J.

The Transport of Wounded in Mountain Warfare.—The following illustrations have been reproduced by permission of the Honorary General Secretary from Médecin-Major Eybert's paper presented to the Section of Naval and Military Medicine at the Seventeenth International Congress of Medicine. The illustrations show different ways of transporting helpless patients down the side of a hill. C. E. P.

Fig. 1.—To illustrate the use of a sleigh on a rocky slope.

Fig. 2.—A stretcher converted into a travois.

Fig. 3.—Stretchers on travois.

Fig. 4.—Eybert's stretcher used as a carrying chair.

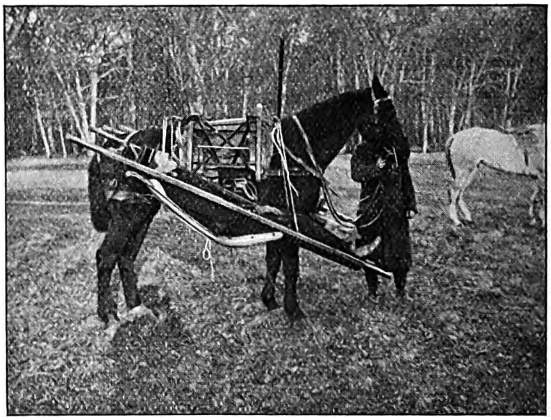

Fig. 5.—Eybert's stretcher used as a litter.

The Resistance of Spores to Heating in Anhydrous Fluids.—H. Bullock (*Journal of Hygiene*, July, 1913, p. 168) finds that in the sterilization of glycerine or oil the use of the autoclave is not necessary, since the exposure of spores suspended in glycerine or oil to superheated steam acts no more rapidly than heating these fluids to the same temperature at atmospheric pressure. The heating of spores in glycerine or oil has no greater sterilizing action than heating them in dry air at the same temperature for the same time. A temperature of 170° C. for half an hour or 180° C. for ten minutes is necessary for the sterilization of glycerine and oils. C. B.

Surgical Experiences with the Bulgarians.—Reg. arzt. Dr. Ballner (*Militärarzt*, May 24, 1913), who formed one of the Austrian Red Cross Mission with the Bulgarians, read a long paper on his experiences in the war, at a meeting of the Military Surgeons' Society in Vienna. Ballner remained with Frisch at the General Hospital in Sofia, and consequently only saw the wounds some time after they had been inflicted.

The condition of the dressings on the admission of the patients varied greatly; only a few were satisfactory. When there had been little hæmorrhage mastisol acted well, but otherwise it was somewhat inclined to shut in the exudation. In some cases in which an insufficient quantity of gauze had been used, it had become saturated with blood which had dried, forming an impervious covering under which pus was pent up. Many wounds which had not been dressed at all healed up by primary union. All convoys of wounded arrived at night time, and every case showed more or less pyrexia which, however, in most cases, subsided during the next few days.

During the time the hospital was open 1,000 patients were treated in it. Of these 300 were wounded; the remainder were cases of typhoid fever, dysentery, rheumatism, and pneumonia.

The voluntary aid nurses were not at all satisfactory, and refused to carry out many of a nurse's ordinary duties.

Many of the wounds were infected with *Bacillus coli;* these proved very refractory to treatment, but seldom gave rise to pyrexia.

Almost the only examples which Ballner saw of wounds inflicted at close ranges occurred during an attack on Adrianople. All of the men were hit in the hand; there was very considerable damage to the bones and soft parts. The remainder of the attacking party were stated to have been killed.

In one case of bullet wound of the head the patient was trephined on three separate occasions, and on each of these a cerebral abscess was opened and drained; in spite of the fact that practically the whole of the right half of the brain had become transformed into an abscess the man lived for thirty-one days after receiving the wound.

Plaster of Paris was most useful in treating fractures of the lower extremity. Wounds of the joints when not septic healed up quickly and left no limitation of movement; when infected they proved most troublesome. Conservative surgery was practised whenever it was possible. Only eight amputations were performed.

Wounds of blood-vessels were relatively extremely common. The size of the resulting hæmatoma varied from a small tumour the size of a fist to a diffuse swelling extending over nearly the whole limb. Pulsation also varied greatly, being in some cases marked and in others absent. Bruits were rarely heard in the tumour. The most important diagnostic sign was the distal pulse; when this could not be detected an aneurysm was always found to be present. Intense pain in the tumour also pointed to aneurysm. The treatment consisted in incising the tumour, turning out the clots, and ligaturing the vessel above and below the wound. The operation was always postponed as long as possible to permit of the collateral circulation being established. C. E. P.

Tuberculosis in the French Army.—The Report of the Senate Commission on the French Army Budget deals very fully with the incidence of tuberculosis in the French army. The admission ratio per 1,000 for all forms of tuberculosis has varied between 5·2 and 7·7, and shows no tendency to diminish. The incidence is highest in the first year of service. From 1901 to 1909 the loss by invaliding and death from all forms of tuberculosis among men with less than one year's service was roughly 13·0 per 1,000; in 1908 this ratio reached 18. In 70 per cent of the cases there is a history of antecedent tubercular disease. In the German army the incidence of tubercular disease is roughly one-quarter of that in the French army; it shows a steady diminution.

Most of the cases are stated to be due to old tubercular foci stirred into activity by the exertions of military life, hence it is pointed out that any man showing suspicious signs of tubercle should, when first examined for military service, be rejected, as otherwise he not only breaks down himself, but is liable to infect other men in the barrack-room. The number of medical officers in the *conseils de révision* has been increased and an order has been issued that each medical officer is not to examine more than thirty recruits in an hour, and that each sitting of the committee is not to exceed three hours. On joining his unit the recruit is to be again medically examined.

The Voluntary Aid Societies have offered to provide sanatorium treatment for a certain number of men temporarily invalided for suspected tuberculous disease. The Minister of War intends in future to grant

temporary pensions to men invalided for tuberculous disease acquired in the army.

The Minister of War also proposes to establish twelve convalescent homes, each for 100 patients. It is calculated that the annual cost for the twelve homes would be £40,000. At the present time one home is actually being got ready. This is in the former Seminary of Sées, which has been handed over to the War Department. The initial cost for alterations and equipment has been estimated at £8,000; this sum is to be paid off in twenty-five yearly instalments. The building will accommodate 150 persons, and will have the following staff: one medical officer, one administration officer, and ten orderlies. C. E. P.

Medical Services of French Army and the Budget for 1913 (Report by the Senate Commission on the Army Budget, 1913).—The total credit voted for the Medical Services was 9,707,961 francs, an increase of 148,254 francs over 1912. Among the items for which the increase was sanctioned the following are of interest: 26,000 francs for antityphoid vaccination, 900 francs for ambulance dogs, and 14,000 francs for motor ambulance wagons.

A laboratory for the preparation of antityphoid vaccine was established under Professor Vincent in the Ecole d'application, Val-de-Grâce, in March, 1911. On June 28, 1911, the Minister of War ordered that all men attending typhoid fever patients and those proceeding to the colonies should be offered antityphoid vaccination. A commission composed of Professors Vincent and Chantemesse was sent to Morocco and Algiers to study the effects of antityphoid vaccination; the results were so satisfactory that on May 18, 1912, the War Minister extended the offer of antityphoid vaccination to the troops in all stations at home or abroad. Since January 1, 1912, the Val-de-Gràce laboratory has furnished a polyvalent vaccine containing strains derived from cases in France, Morocco, and Algiers, sufficient for the inoculation of 48,170 men.

In the French army at home and in Algiers and Morocco there are about 2,000 cases of typhoid fever with 300 deaths in each year.

The vote for ambulance dogs is for the maintenance of twenty-five dogs, i.e., one for each *section d'infirmiers*. The dogs are being presented to the army by the National Society for Ambulance Dogs. Each dog is allowed one penny per day for food in addition to scraps from the company's mess. It is hoped in the future to increase the number of dogs to four or five per section. C. E. P.

Conditions of Fitness for Aviation Service, French Army (No. 68, *Supplement*, *Bull. Off.*, *Ministère de la Guerre*, December 31, 1912).—Candidates before being appointed pilots in the aviation service must fulfil the following conditions of fitness:—

(1) Must have normal vision in each eye without the aid of glasses.

(2) Binocular vision must be normal. They must not suffer from colour blindness.

(3) Hearing must be normal and the middle and inner ear must be free from any defects.

(4) The organs of respiration and circulation must be perfectly sound.

In addition they must in all other respects be physically fit for active service. C. E. P.

Malingering—Feigned Dysentery.—Méd.-Major Troude (*Le Caducée*, June 7, 1913) reported a small outbreak of what at first appeared to be dysentery among the prisoners in Fort Gassion. There had been no case of dysentery for many years in this prison; there was no communication with the civil population and the food and water were above suspicion, hence the occurrence of dysentery seemed somewhat strange. The patients obviously suffered from severe abdominal pain; they passed some six slightly blood-stained motions daily, the act being accompanied by severe tenesmus. There was no pyrexia, the facial expression did not become anxious, and none of them lost weight. Bacteriological examination of the fæces failed to reveal any of the usual causes of dysentery. The cause of the epidemic was cleared up by one of the patients confessing that the disease had been induced by swallowing alum and soapy water, and by inserting a peeled onion into the rectum on going to bed at night. The treatment consisted in giving full doses of ipecacuanha and a very restricted milk diet; this speedily brought about a cessation of the attacks.

C. E. P.

Correspondence.

MARKING OF HOSPITAL UTENSILS.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—I wrote in the April number of the Journal a letter on the above in India and have now waited several months in the hopes of seeing some discussion started therefrom on this matter, but none has been, although privately I have received letters from senior and junior officers both at home and abroad on the subject, from which I see that I am not the first to have tried to ventilate this question (I may say, I hardly expected I was); but so emphatically do some of my correspondents write on the point, that it is evident the matter is a more important one than I have hitherto considered it to be. With their letters I concur. I certainly think that the application of my original letter should be extended to all equipment of infectious or venereal cases and wards—blankets and bedsteads included, allowing the latter to be in more sombre shades, so that when exposed in the sun or air for sanitary reasons they would not be made inordinately more apparent to visitors who may be passing round the hospital.

The cost of the changes suggested would be infinitesimal, if any, as pointed out in detail by one of my correspondents, and a very great deal of really unnecessary trouble on the part of all concerned would be avoided.

I may add that at present there is to be supplied a certain percentage of china and crockery marked partly as I have suggested, but it has not come to hand yet and a long time has elapsed since the pronouncement was made. However, even when it does come to hand, it will not cover the ground which both my correspondents and myself consider necessary.

In conclusion, I hope that some of the readers of the Journal who have been in India, and are interested in the further improvement of hospital wards, will let us know their views on this matter through the medium of the Journal.

I am, &c.,

J. H. BARBOUR,

Major R.A.M.C.

THE TREATMENT OF GONORRHŒA WITH HEATED BOUGIES.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In the February issue of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is an article by Majors L. W. Harrison and G. J. Houghton, entitled: "Preliminary Notes on the Treatment of Gonorrhœa with Heated Bougies." This article is especially interesting to me, owing to the fact that on February 24, 1912, in the *Medical Record of New York*, I published an article on the same subject, using similar arguments, citing the same facts, using a similar though more accurate instrument, gaining the same results and arriving at the same conclusions. The writers of the article I refer to in your Journal gave no credit for my work, although my article was quite widely commented upon in the medical press. However, I write this in no sense of criticism, or to question the honesty or integrity of the writers of the article appearing in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. There is no reason why two men or two dozen men in the medical profession of to-day, though widely separated, may not arrive at the same conclusions and adopt the same line of treatment, and each think himself a pioneer in the work.

I have been treating gonorrhœa by the heated bougie method for about four years, have written for the medical press on the subject, and am now more than pleased to find that others are able to substantiate my findings and to parallel my success. Not being a specialist in the genito-urinary line, the number of cases I have treated is not large. However, I have treated some fifty cases in all stages of the disease, and with far more success than is ordinarily obtained through any other treatment. I have felt also that when a patient is well, following this treatment, he is really *cured* in every sense of the word. I have employed a bacteriologist to endeavour to cultivate the gonococci from the urethral discharges of a genuine case of gonorrhœa, twenty-four and forty-eight hours after the heated bougie has been used. The efforts so far have resulted in a complete failure, not a single culture being obtained. Whether or not this one report may be depended upon I am unable to say, but intend as soon as opportunity arrives to have it tried again by other laboratory workers.

I am, &c.,

J. A. FULTON, M.D.

Astoria, Oregon, U.S.A.,
August 12, 1913.

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ON THE VARIATION OF THE *BACILLUS TYPHOSUS*.

BY COLONEL W. H. HORROCKS.
Royal Army Medical Corps.

IN a previous paper[1] I showed that under the influence of the bacteria-free toxins present in a filtered mixture of typhoid urine and water, the *Bacillus typhosus* might change into a bacillus indistinguishable from the *B. fæcalis alkaligenes*, and that when this organism was passed through the peritoneal cavity of a guinea-pig, evidences of further change were obtained. I also pointed out that the factors concerned in the passage experiments could not be completely controlled, so that, while a re-conversion of *B. fæcalis alkaligenes* into *B. typhosus* would have a definite signification, a conversion of the alkaligenes type into *B. coli* or streptococci must be open to doubt, as these variants are normal inhabitants of the guinea-pig's alimentary canal, and it is conceivable that the injections might cause changes in the walls of the intestines leading to the passage of intestinal microbes into the peritoneal cavity. Variation resulting from the action of bacteria-free toxins is not open to the same objection, as definite controls can be provided for these experiments. Consequently, in the work which I am about to describe, the experiments were mainly limited to the study of the effects of bacteria-free toxins on the *B. typhosus*. The experiments may be divided into three groups :—

Group I.—To study the action on the *B. typhosus* of bacteria-free toxins present in a mixture of typhoid urine and water.

[1] JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, March, 1911.

Group II.—To study the combined effects on the *B. typhosus* of the toxins and living bacteria present in a mixture of Kent well water and typhoid urine.

Group III.—To determine whether it is possible by animal experiment to re-convert the *B. fæcalis alkaligenes* into the *B. typhosus.*

Experiments in Group I.

To study the action on the *B. typhosus* of the toxins developed in a mixture of typhoid urine and water.

Forty-five specimens of urine were obtained from twenty-seven recent cases of enteric fever and from one "carrier." One part of each specimen was at once mixed with nine parts of tap-water, then put in a flask plugged with cotton wool and exposed to light at the laboratory temperature. At periods varying from seventeen to seventy-four days the contents of each flask were filtered through a sterilized Doulton white candle, no pressure being employed. At the end of thirty-six hours the filtrate collected was treated as follows :—

(*a*) One cubic centimetre was added to broth and incubated at 37° C.; if no growth occurred at the end of five days, the filtrate was considered to be sterile and the broth tube was then removed from the incubator and kept in a cupboard, exposed to light, during the whole course of the experiment.

(*b*) Ten cubic centimetres were placed in a sterile test-tube and inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R), the stock culture which has been used for some years in the manufacture of vaccine in the Royal Army Medical College. The inoculated tube was also placed in a cupboard exposed to light.

(*c*) The portion of the filtrate remaining in the flask, after removal of the 11 c.c. for tubes (*a*) and (*b*), was also kept in a cupboard exposed to light, and control tests were made with it as will be explained later.

Five of the inoculated filtrates showed a growth in the control tube (*a*) and were at once discarded. The remaining forty filtrates which had been inoculated with *B. typhosus* (R) were examined weekly; a standard loopful (0·002 grm.) from each tube being spread over the surface of a glucose neutral red bile salt agar plate, which had been previously incubated at 37° C. for forty-eight hours in order to dry the surface of the medium and make certain of its sterility.

The typhoid bacilli present in thirty-two of the filtrates never showed any deviation from the standard type; but in six of the filtrates changes occurred which will now be described in detail.

Filtrate No. 1.—The urine in the case of this filtrate was obtained from a boy suffering from typhoid fever; he was considered to be in the ninth day of disease when the specimen was collected. Typhoid bacilli could not be isolated from the urine. The mixture of one part of urine and nine parts of tap-water was kept for nineteen days at the laboratory temperature exposed to light and then filtered. The sterile filtrate was inoculated with a very small particle of a twenty-four hours' agar growth of *B. typhosus* (R). Fourteen days later all the typhoid bacilli appeared to have died out, as no growth was obtained on the plate inoculated with the standard loop, and 1 c.c. of the filtrate added to broth and incubated at 37° C. did not show the slightest turbidity. The filtrate was therefore re-inoculated with a slightly larger quantity of a twenty-four hours' growth of *B. typhosus* (R). A week later, one standard loopful of the filtrate spread over a glucose neutral red bile salt agar plate produced a pure culture of typhoid bacilli. Fourteen days after the re-inoculation of the filtrate a glucose neutral red bile salt agar plate prepared in the same manner showed red and white colonies. The red colonies when investigated gave all the reactions of typhoid bacilli. The white colonies, however, consisted of highly motile, Gram-negative bacilli which did not ferment glucose, lactose, mannite, cane sugar, salicin, dulcite, or sorbite, after incubation at 37° C. for fourteen days. After twenty-nine days' incubation a slight reddening of the glucose tube was noticed, but the other sugars were quite unaffected. The bacilli did not liquefy gelatine or change neutral red; but in litmus milk they produced a characteristic reaction, the medium being first rendered acid and then strongly alkaline. The bacilli grew well in broth, which acquired a somewhat sickening odour, but indol was not produced. When tested with a potent anti-typhoid serum the bacilli showed no real agglutination; occasionally some aggregation of the bacilli was noticed with a low dilution of the serum, but the clumps never had the appearance of a true agglutination. Moreover, the bacilli had no power of absorbing the typhoid agglutinins from the serum, and when injected into a rabbit failed to produce any typhoid agglutinins in the animal's serum.

There seems to be no doubt that some of the typhoid bacilli added to the filtrate had changed their biological characters and assumed those of the *B. fæcalis alkaligenes*. It was always

noted that the subcultures of the changed bacilli were remarkably vigorous, so the failure to ferment the sugars cannot be attributed to feebleness of growth. By subculturing from agar to agar once a month I have preserved a culture of these bacilli for more than a year, and when last tested they gave the same cultural reactions as I have just described. I do not think there can be any question of the purity of the typhoid culture, which was the parent of the *B. fæcalis alkaligenes*. The culture of *B. typhosus* (R) has been used for the preparation of anti-typhoid vaccine for some years and has been repeatedly tested by bacteriologists of acknowledged repute. The culture could not possibly have contained any bacilli of the alkaligenes type when I commenced my experiments. It should also be noticed that when the inoculated filtrate was first tested only pure typhoid bacilli were isolated.

Now as to controls: The broth containing 1 c.c. of the original filtrate was kept during the whole time of the experiment and the medium never showed the slightest trace of growth. Moreover, the moment the change in the typhoid bacilli occurred 0·5 c.c. of the original uninoculated filtrate was plated on glucose neutral red bile salt agar; the plate, however, remained sterile. As the standard loop employed to inoculate the plate containing the alkaligenes type of bacilli only held $\frac{1}{500}$ c.c., I think it must be admitted that the amounts used in the control tests were sufficient to prove the sterility of the original filtrate. As the plates also were incubated for forty-eight hours before use there does not seem any loophole through which a contamination could have gained access to the plates or media employed.

Filtrate No. 2.—The urine in the case of this filtrate was passed by a woman who was supposed to be convalescing from enteric fever. The specimen when examined in the usual manner was found to contain the *B. coli* and a microbe which gave the sugar reactions of *B. typhosus*, but produced alkali in milk and indol in broth. It was, however, non-motile and quite unaffected by a powerful anti-typhoid serum even in low dilutions. It failed to absorb the specific agglutinins from an anti-typhoid serum, and when injected into a rabbit failed to produce any typhoid agglutinins. A second specimen of urine obtained from the same patient a week later contained, however, *B. coli* and a *B. typhosus* which answered to all the usual cultural and serological tests. In view of this discovery I thought it would be interesting to try the effect of intraperitoneal passage on the aberrant microbe. Accordingly twenty-three passages through guinea-pigs were made, but the microbe remained quite unchanged.

The first specimen of urine when received at the laboratory was diluted 1 in 10 with tap water and kept at the room temperature for seventeen days. It was then filtered and the filtrate tested for sterility in the usual manner. The test being satisfactory the filtrate was then inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R). Fourteen days later all the inoculated bacilli had died out; the filtrate was then re-inoculated with a larger quantity of a twenty-four hours' growth of *B. typhosus* (R). A loopful (0·002 grm.) of the inoculated filtrate when plated a week later on glucose bile salt neutral red agar produced a pure culture of typhoid bacilli answering to all the usual tests. A similar result was obtained at the next testings. But a month after the filtrate had been re-inoculated a loopful (0·002 grm.) plated on glucose neutral red bile salt agar showed the presence of red and white colonies. The red colonies were found to be composed of typical typhoid bacilli, but the white colonies gave exactly the same reactions as the white colonies found in the plate made from filtrate No. 1. The control tests were made as described on p. 504, but the broth tube and plates showed no signs of growth. Evidently some of the typhoid bacilli present in filtrate No. 2 had changed to the alkaligenes type.

Filtrate No. 9.—The urine was obtained from a recent case of enteric fever, but no typhoid bacilli could be isolated from the specimen, which appeared to contain *B. coli* in large numbers. The urine was diluted 1 in 10 with tap water and left exposed to light at the laboratory temperature for forty days. It was then filtered and the filtrate tested for sterility. The control broth showing no signs of growth, the filtrate was inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R). The inoculated filtrate was examined in the usual manner, and at the end of three weeks all the typhoid bacilli had disappeared and had been replaced by bacilli giving all the reactions of the *B. fæcalis alkaligenes* isolated in Experiments Nos. 1 and 2, except that the glucose was never acidified after prolonged incubation at 37° C. The original control broth tube, however, showed no growth and 1 c.c. of the uninoculated filtrate planted in broth remained sterile after fourteen days' incubation at 37° C.

Filtrate No. 11.—The urine was obtained from a recent case of enteric fever and contained large numbers of typhoid bacilli, a few Gram-staining cocci, but no *B. coli*. It was diluted 1 in 10 with tap water, left exposed to light at the laboratory temperature for forty days and then filtered. The filtrate, having been proved

to be sterile, was inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R). Through an over-sight the inoculated filtrate was not examined for three weeks, when all the bacilli appeared to have died out. The filtrate was then re-inoculated with a larger quantity of a twenty-four hours' growth of *B. typhosus* (R). A week later one standard loopful of the filtrate was plated on glucose bile salt neutral red agar, and a pure culture of *B. fæcalis alkaligenes*, which did not acidify glucose, was obtained. No signs of typhoid bacilli could be discovered on the plate. At this date the original broth control tube showed no growth and 1 c.c. of the uninoculated filtrate planted in broth also proved to be sterile.

The inoculated filtrate was examined from time to time and bacilli of the alkaligenes types were found in gradually decreasing numbers at each examination. No other microbe was ever found even when 1 c.c. of the inoculated filtrate was planted in broth and then plated on glucose bile salt neutral red agar.

Filtrate No. 21.—The urine was obtained from a recent case of enteric fever and found to contain many typhoid bacilli, a few *B. coli* and a few Gram-staining cocci. The urine was diluted 1 in 10 with tap water, left at the laboratory temperature exposed to light for fifty days and then filtered. The sterile filtrate was inoculated with a small particle of a twenty-four hours' agar growth of *B. typhosus* (R). Seven days later one standard loopful of the inoculated filtrate was plated on a large glucose neutral red bile salt agar plate when only white colonies appeared. These colonies, when fished to agar and planted in the various differential media, were found to be made up of the *B. fæcalis alkaligenes*, which did not produce acid in glucose; no signs of typhoid bacilli could be discovered. Meanwhile the control broth tube had shown no change, and 1 c.c. of the uninoculated filtrate planted in broth caused no growth in that medium after fourteen days' incubation at 37° C.

The inoculated filtrate was kept under observation for ten months and plated at frequent intervals; on every occasion the *B. fæcalis alkaligenes* was recovered in pure culture, no signs of typhoid bacilli were ever detected.

Filtrate No. 29.—The specimen of urine was obtained from a recent case of enteric fever and contained typhoid bacilli, Gram-staining cocci and coliform bacilli. The mixture of urine and water (1 in 10) was kept at the laboratory temperature for fifty-six days and then filtered. The sterile filtrate was inoculated with a small

particle of a twenty-four hours' agar growth of *B. typhosus* (R). Controls were made in the usual manner. The inoculated filtrate was examined at frequent intervals, but only *B. typhosus* in gradually decreasing numbers was isolated. At the end of a month 1 c.c. of the inoculated filtrate had to be planted in broth before a growth of typhoid bacilli could be obtained. At the next examination 1 c.c. of the inoculated filtrate again produced a growth in broth, but the microbe present proved to be a pure culture of *B. fæcalis alkaligenes*, which produced no change in glucose. The controls were then examined; the original broth tube containing 1 c.c. of filtrate showed no growth, and 1 c.c. of the uninoculated filtrate when planted in broth produced no growth after three weeks' incubation at 37° C.

It will be noticed that the strains of *B. fæcalis alkaligenes* isolated in these experiments fall into two groups:—

(*a*) The strain, isolated in Experiments Nos. 1 and 2, which produced a small amount of acid in glucose. The strain No. 2 was only subcultured for three months after it was isolated, but strain No. 1 has been kept for more than a year, and the growth on agar is now somewhat granular and difficult to emulsify and has acquired a faint yellow colour. In other respects it is unchanged; it is still a highly motile bacillus, slightly smaller than the *B. typhosus*, causes a markedly alkaline reaction in milk after a few days' incubation at 37° C., and produces a small amount of acid in glucose.

(*b*) The strains isolated in Experiments Nos. 9, 11, 21 and 29. These strains never produced a trace of acid in glucose after incubation for one month at 37° C. As regards morphology and motility they were identical with Nos. 1 and 2. Nos. 11 and 21 have been kept for a year and regularly subcultured once a month. They are quite unchanged, and the growth on agar still resembles that of *B. typhosus*.

Serological tests were then made to ascertain if there were any differences in the reactions of the two groups with specific sera.

As regards anti-typhoid serum both groups gave the same reaction, viz., an aggregation of bacilli, but no real agglutination, with the serum in low dilutions. Both groups also failed to absorb the typhoid agglutinins. The strain isolated in Experiment No. 1 was then injected into two rabbits. Both animals produced a serum which, when diluted 1 in 1,000, readily agglutinated strain No. 1, but failed to agglutinate Nos. 11 and 21, even when the serum was only diluted 1 in 20. The serum, however, when diluted 1 in 100 agglutinated the typhoid bacillus, but higher dilutions

caused no trace of a reaction. The serum was then absorbed with strains Nos. 1, 11 and 21, and with the *B. typhosus*. The results are shown in the following tables:—

Rabbit Serum produced by Strain No. 1.

Absorbed with Strain No. 1.

	Dilution of serum			
	1—20	1—100	1—500	1—1,000
Tested with—				
Strain No. 1	0	0	0	0
B. typhosus	0	0	0	0

The same Serum absorbed with B. typhosus.

	Dilution of serum			
	1—20	1—100	1—500	1—1,000
Tested with—				
Strain No. 1	+	+	±	0
B. typhosus	+	0	0	0

The same Serum absorbed with Strain No. 11.

	Dilution of serum			
	1—20	1—100	1—500	1—1,000
Tested with—				
Strain No. 1	+	+	+	+
B. typhosus	+	±	0	0

Rabbits were also injected with strains Nos. 11 and 21. It was found difficult to produce agglutinins for these bacilli. At the present time the sera in higher dilutions than 1 in 100 do not agglutinate their own bacilli, but in this low dilution they appear to react equally with the two strains, viz., serum 11 agglutinates strain No. 21 and serum 21 agglutinates strain No. 11.

Group II.

To study the effects on the *B. typhosus* of the toxins and bacteria present in a mixture of typhoid urine and *unsterilized* Kent well water.

Twenty-six specimens of water from the Kent wells were obtained through the kindness of Dr. Houston. To each specimen one-tenth of its volume of typhoid urine, obtained from Carrier I,

was added and the mixture exposed in sterile test-tubes to sunlight at the laboratory temperature. Controls of the water and specimens of urine were carefully tested for the presence of *B. fæcalis alkaligenes* and *B. coli*. Neither of these microbes could be detected, although ten times the volume of water and urine placed in the test tubes was subjected to examination. Some of the specimens of urine contained enormous numbers of typhoid bacilli, so that the number of these bacilli added to the samples of Kent well water varied from 5,000 to 5,000,000 per cubic centimetre of the mixture.

The inoculated specimens of well water were examined at frequent intervals for several months.

Sample No. 8 is of peculiar interest as in it after the disappearance of the *B. typhosus* in the fifth week after inoculation with the typhoid urine, a bacillus appeared which corresponded to the *B. fæcalis alkaligenes*, isolated in the experiments described in Group I (Nos. 9, 11, 21 and 29), except that the production of alkali was not quite so marked. As regards the appearance of colonies, sugar tests, morphology and motility the bacilli appeared identical.

In the remaining twenty-five specimens of inoculated well water the *B. fæcalis alkaligenes* was not found. The *B. typhosus* gradually died out, Gram-staining cocci and bacilli of the *B. fluorescens liquefaciens* group being detected. Both these organisms were present in the typhoid urine. The persistence of the typhoid bacilli in some of the specimens is worthy of note. In the first sample, to which 5,000 bacilli per cubic centimetre were added, 500 typhoid bacilli per cubic centimetre were isolated five and a half months later. In the third specimen containing 6,000,000 bacilli per cubic centimetre 1,000 typhoid bacilli per cubic centimetre were isolated at the end of four months.

Group III.

To determine whether it is possible by animal experiment to re-convert the *B. fæcalis alkaligenes* type (Group I), into *B. typhosus*.

(a) *Intra-peritoneal Passage in Guinea-pigs and Rabbits.*

It has already been pointed out that the conversion of *B. fæcalis alkaligenes* into *B. coli* or Gram-staining cocci which are normal inhabitants of the alimentary canal of guinea-pigs and rabbits must be open to doubt. A conversion to *B. typhosus* would, however, be significant, and it appeared worth while to test

one of the specimens of *B. fæcalis alkaligenes* by intraperitoneal passage.

The bacillus isolated in Experiment No. 9, Group I, was selected and subjected to thirteen passages, ten in guinea-pigs and three in rabbits. No change, however, occurred except that the production of alkali in milk appeared to be delayed. The *B. fæcalis alkaligenes*, when first isolated in Experiment No. 9, produced a strong alkaline reaction in milk after seventy-two hours' incubation at 37° C., but after intra-peritoneal passage the production of alkali was not marked until after fourteen days' incubation at 37° C.

(*b*) *Intravenous Injection into Rabbits.*

Four rabbits were injected intravenously with one-quarter of an agar slope of the *B. fæcalis alkaligenes* isolated from filtrate No. 1. The rabbits showed no symptoms; two of them were killed four days and two nine days after the injection. Cultures were made from the bile, scrapings of the gall-bladder, liver, spleen and blood; no growth occurred in any of the tubes. Two other rabbits were injected intravenously with one-quarter of an agar slope of *B. fæcalis alkaligenes* isolated from filtrate No. 11. Eight days later the rabbits were killed and subcultures made from the blood, spleen, liver, bile and scrapings of the gall-bladder. No growth occurred in any of the tubes.

(*c*) *Feeding Experiments.*

(1) A small black monkey was fed with milk containing the growths on two plates of *B. fæcalis alkaligenes* isolated in the first and eleventh experiments described under Group I. No rise of temperature or sign of illness resulted. The stools were perfectly normal and no signs of *B. fæcalis alkaligenes* or *B. typhosus* were found in the fæces. Thirteen days after feeding blood was removed from a vein in the leg and planted in a large quantity of broth. The *B. fæcalis alkaligenes* was isolated in pure culture after the broth had been incubated for four days at 37° C.

The monkey was kept under observation for several weeks and the blood and fæces were examined at frequent intervals. No signs of *B. typhosus* were detected in the blood or in the excreta.

(2) A small baboon from the West Coast of Africa was fed on three successive days with milk containing a forty-eight hours' growth of *B. fæcalis alkaligenes* isolated in Experiment No. 1 of Group

I. An examination of the stools was commenced a week later and blood was also removed from a vein of the left leg and planted in a large quantity of broth. No growth occurred in the broth, and the stools showed only organisms of the *B. coli* type. A week later after a dose of calomel the *B. fæcalis alkaligenes* was isolated from the fæces. The fæces were examined for a period of four weeks, but no signs of the *B. typhosus* appeared, nor was the *B. fæcalis alkaligenes* again isolated, although calomel was given on several occasions.

A month later the baboon was fed on milk containing the growth of strain No. 11 on two large agar plates. The stools were examined twice a week for a month, but no signs of strain No. 11 or of the *B. typhosus* were ever detected.

Conclusions.

The results of the experiments described in Group I show clearly that under the conditions therein described the *B. typhosus* may be converted into *B. fæcalis alkaligenes*.

I am unable to afford any evidence as to the epidemiological significance of this variation. The *B. fæcalis alkaligenes* appears to have no pathogenic effect on ordinary laboratory animals, and it has not been possible to re-convert this variant into the *B. typhosus*.

SOME OLD INDIAN GENERAL ORDERS.

By Colonel R. H. FIRTH.

From certain previous contributions to this Journal, its readers will have gathered that the dipping into old records has been a hobby with me for some time. Looking through my notebook recently, I have come across a number of entries which present material that should not be without interest to others. It is true they relate to times long gone by, but, inasmuch as they cover ground which each year gets more difficult to traverse, their subject matter is such that the pages of our Journal form the fittest place wherein to store these archaic trifles and thereby enable it to become, in some measure, a treasure chest for anyone who, in years to come, wishes to put together a connected history of military medical affairs. The odds and ends which are now submitted are taken from old General Orders ranging from 1760 to 1801. All do not relate to medical matters, but this should not make them any the less interesting; on the contrary, the mere fact that they afford also an insight into other old-time service questions should be a merit in the estimation of the would-be well informed army doctor of these days. It is convenient to divide those notes into sections which deal respectively with medical matters, recruits, pay and allowances, invalids, pensioners, retirements, passages and miscellaneous. The data being entirely extracts made from old General Orders, it is difficult to make the article very readable, but it is hoped that, in mitigation of any such defect, due allowance will be made for the nature and the difficulties associated with the collection of the material on which the article is based.

I.

In an earlier article, dealing with medical affairs during the Carnatic, Mysore and Travancore campaigns, I gave details of certain orders issued in 1760 as to the conduct of medical administration at that time. They appear to have held good till 1787 when, in a G.O. of October 1, one finds the following: "The honourable the President in Council directs that the following regulations prescribed by the company for conducting their military hospitals in India, shall take place this day. That the members of the hospital board shall recommend to the Governor and Council the most able and deserving officers to direct and superintend the duties

of each hospital, and are to be responsible for the conduct of those who may be appointed in consequence of their recommendations. Where a vacancy of surgeon at the head of any of the hospitals shall take place, the hospital board will recommend to the Governor in Council the most deserving regimental surgeon for the succession, the most deserving hospital mate to succeed the regimental surgeon, and the most deserving regimental mate to succeed the hospital mate. But although the most ample encouragement is hereby given to merit, yet it must also be understood that seniority and equal merit are to have the first claims to promotion." Accompanying this Order were issued regulations; these for the most part are not legible as the writing is faded and such as can be read do not contain anything of special interest; they are not here reproduced. One finds nothing on medical affairs till February 20, 1794, when the following G.O. appeared: "Agreed that the following paragraph of the military board's letter be published. Having proceeded to the examination of sundry unfit men belonging to the artillery, and first and second battalions of European infantry, it has occurred to us that as it requires much professional experience to form a correct opinion, as to the necessity of a change of climate for the recovery of diseases, it would tend greatly to the benefit of the public service, if the hospital board were to examine and offer their professional opinions upon the several cases, previous to the men being brought before this board for our opinion on their respective claims; particularly as many of the people reported unfit have been only one or two years in the honourable company's service, and a great part of that time in the general hospital, should you approve of this regulation to be established, we think the returns should be made out according to the accompanying form. Agreed that their recommendation be adopted and established as an regulation."

Under a G.O. dated August 26, 1796, it is ordered that "the medical board, conformably to the orders of the court of directors, consist of two members under the denomination of first and second members, who are to superintend, under the commander in chief or officer commanding the troops, the management of the medical department in the military line. The hospital surgeon at the presidency no longer to have a seat at the board. The medical gentlemen attached to the company's troops to have the same rank with respect to the army that they now hold. The medical board are also to superintend, under the Governor in Council, the medical department of the civil service. Applications from medical

gentlemen in the military line to be transmitted to the medical board, with the previous concurrence and consent of commanding officers of stations; the medical board to forward them with their remarks to the commander in chief by whom, if necessary, they will be laid before the Governor in Council. All recommendations for vacancies and promotion in the military line to originate with the medical board, and to be laid before the Governor in Council by the commander in chief, should he see no objections to the recommendation."

In 1798, the medical service of the Company appears to have been reorganized, as the following regulations were published under a G.O. dated August 3, and directed to come into force from September 1. They run as follows: "The honourable the Governor in Council having resolved that the purveying system shall cease, and that the surgeons of His Majesty's and the honourable company's service shall receive a specific allowance for providing the sick, subject to no contingencies, the institution of general hospitals is no longer necessary; they are accordingly everywhere abolished, excepting one at the presidency, which is retained to provide for invalids, pensioners and discharged men, and particularly for accidents which frequently occur. The surgeon in charge of the general hospital shall be allowed one rupee per day for each European, including the stoppages which are to be deducted. For this sum he is to supply the sick with diet, clothing, cotts, bazar medicines and every other necessary, Europe medicines excepted. The surgeon of the general hospital shall be allowed 60 rupees per month for servants, which is also to defray any expense that may be required for doolies; for native patients he will receive at the rate of 20 rupees a hundred to purchase bazar medicines, including flour for poultices, bandages, &c.

"The surgeons of His Majesty's and honourable company's European regiments and corps shall have the entire charge and management of the sick of their respective battalions, and are to supply them with food, including wine when requisite, cloathing, and every article necessary for the condition of the sick, subject to such controul as shall hereafter be mentioned. The regimental surgeon shall supply the hospital with servants for the purpose of preparing medicines and attending the sick in the following proportion; one ward boy for every six men, and also one for every patient bed-rid, besides the following proportion for each 100 men which is always to be kept up, namely, two compounders, two dressers, three coolies for pounding the mortar and boiling

decoctions, and four halalcores. The regimental surgeon shall supply the hospital with lamp oil, potts, mallies, pans and firewood for the use of the cook room and dispensary. He shall also provide cooks, washermen and water for every purpose. The surgeons are further to provide doolies and defray the expence of bearers for conveying the sick from the barrack to the hospital. Each patient is to be supplied with the following articles of dress, namely, a pair of long drawers, a banian and a night cap. In order to defray the expence of the foregoing articles or supplies as well as any that may be subsequently mentioned, the surgeon of a European regiment and of the artillery battalion shall be allowed to draw from the company two annas per diem for every man sick or well, borne present on the muster rolls, commissioned officers included, in addition to the ordinary stoppages of three annas and nine pie per day from the pay of each man in the hospital. The expence of sick Europeans occasionally left in places at a distance from the headquarters of the corps, must be paid for by the surgeon, and they are to be included in the number drawn for, under the head of sick absent. The surgeon in whose care they remain shall receive the stoppages and charge besides, by a bill of honour, the regimental surgeon with any additional expence he may have been at on their account. It will be optional with the latter to furnish cotts or other articles as he may be able to spare from his establishment, by which management it is expected the extra expence will be reduced. The European hospitals of both a King's or company's corps must admit as patients all sailors of the royal navy or of the honourable company's service, upon the requisition of a commander of their respective ships. These sailors must be afforded medical attendance and all necessaries at the same rate as shall be established for the general hospital at the presidency; strangers are entitled to be received in the same manner. Government will provide hospitals, Europe medicines and instruments in all situations as heretofore. The surgeons of European regiments and corps are to take the stores at present in use at a fair valuation."

"By surgeons and assistant surgeons of native regiments and corps the following monthly allowance is to be drawn for providing bazar medicines and servants, including materials for poultices, fumigations, bandage cloth and every expence attending this description of sick, together with that of the European commissioned and non-commissioned officers; Europe medicines excepted. The surgeon of a regiment of native infantry shall draw per month rupees 400, or for each battalion rupees 200. The

surgeon of artillery for the artillery and arsenal lascars 200 rupees, or at the rate of 20 rupees for every 100 men. The surgeon of the marine battalion to draw 200 rupees, and the surgeon of the corps of pioneers shall be allowed monthly 100 rupees. All medicinal expences on account of detachments are to be defrayed by the surgeon; but as it appears from a comparative statement that the nature of the service on which the marine battalion is employed occasions in that corps a greater proportion of sick, the surgeon will always draw the full allowance, which is not in this instance to be regulated by the number of men present, with the exception of such detachments as may be doing duty on shore, which are to be deducted and drawn for by the surgeon who gives them medical attendance at the rate of 20 rupees for every 100 men. The practice of putting sepoys or native patients under stoppages is discontinued, and the native troops are to suffer no deductions. The following proportion of servants is fixed for native corps: One native assistant, one dresser, one compounder and two halalcores in the proportion of one ward boy to every ten patients. On a probability that a complete regiment will seldom be at the same station, the allowance to surgeons of native corps shall be considered payable by the paymasters of stations to the surgeons or assistant surgeons, according as they may be in charge, in proportion to those present at the rate of 20 rupees for every 100 men, including the European commissioned and non-commissioned officers. The bills for which are to be certified by the officer commanding as corresponding with the muster rolls. The sick of native regiments are neither to be supplied with cloaths, bedding, nor victuals at the expence of the surgeon. But they are to be supplied with cotts to be made by the artificers of the corps, and the surgeon shall be allowed the annual sum of 200 rupees for a regiment, or 100 rupees for a battalion, to purchase all the materials. Surgeons of pioneer corps to draw for the same purpose, annually 50 rupees."

"The apothecary or medical storekeeper is to make supplies of all country articles to European corps only. He is to furnish them on indent from the surgeon with bazar medicines, hitherto provided by the purveyor, together with wines and spirits for medical preparations. To provide for the above supplies the medical storekeeper shall draw the sum of one anna per day for every man sick or well on the muster roll. For this he is also to be at the expence and risk of forwarding them to the subordinates, and is to make no further charge. The medical board are responsible that regimental surgeons are supplied duly with their needs

by the medical storekeeper, and to prevent exorbitant demands upon him all indents will be countersigned by the board before the storekeeper complies therewith."

Issued with the above G.O. were regulations for the inspection and control of the various hospitals. These need not be repeated here; it suffices to say that they involved a monthly inspection of the general hospital at the presidency by a member of the medical board, and of all other hospitals quarterly by the head surgeon of districts. All regimental hospitals were to be visited daily by commanding officers and once a week by the field officer. The latter was to make a written report which was to be transmitted with the monthly returns to the commander-in-chief. As regards returns, these seem to have been fairly simple and rendered monthly. In order to defray the expenses of their inspections the head surgeons of districts were allowed the sum of 210 rupees a month, in addition to their pay and allowances. This made their monthly salary to be 750 rupees, including everything.

By a G.O. dated September 4, 1798, all reports and returns affecting the sick and hospitals of the King's regiments and forces in the Company's territory were directed to be sent monthly to Doctor Ewart, the physician and inspector general of hospitals in the isle of Ceylon. By a G.O. of August 29, 1799, these returns were also ordered to be sent monthly to the Company's medical board.

There is little said in these times of field service conditions. We find, however, the following medical regulation for the field in a G.O. of September 13, 1798: "All hospital doolies and bearers shall be under the charge of the superintending surgeon. The surgeons shall indent to the head surgeon for such number of doolies as the exigency of the service requires. These indents to be countersigned by the commanding officers of corps. One muccadum and twenty coolies to be allowed to regimental surgeons for the conveyance of Europe medicines and instruments, wine, country medicines, spirits, &c., for each European regiment of 1,000 strong, and so in proportion to all other European corps, in the field. Surgeons of native infantry will be allowed one muccadum and five coolies for each battalion for the conveyance of medical stores, and to surgeons of artillery and pioneers in same proportion. The surgeons of European corps shall have one anna in addition to their allowance in peace. This will make 5 annas allowed to the surgeon and medical storekeeper for providing the sick with the articles they require. The surgeons of native corps

to draw 5 rupees per month for each company in addition to their present allowance. When sick, whether european or native, are left behind in the field the regimental surgeon shall pay for such expences as are incurred from his allowance, and the surgeon into whose charge those sick are left shall give him, on honour, an account of their actual cost."

A G.O. of July 31, 1799, shows the presence of a question then not unlike one of our time; it runs as follows: "From what has been argued by the Bengal government against the separation of the civil and military lines of the medical profession, we have been induced to wave our former directions (G.O. of January 5, 1799), and to permit the whole medical corps, as at present, to rise in one general list. Those who are appointed to civil stations must therefore be considered as equally liable to be recalled upon military service; but we direct that it be made a standing regulation in the future, that if any surgeon holding a civil appointment shall decline taking upon him the duties of the military line, when he is called upon, he shall be considered as having totally relinquished all pretensions to future promotion in that line, to the charge of a general hospital, or a seat at the medical board, nor shall he be entitled to the benefits of furlough or retiring from the service."

In a G.O. of March 30, 1800, the Governor in Council deemed it necessary for the good of the public service to frame instructions in addition to the medical regulations. One is tempted to quote a few of them. "As the prevention of disease is not less important than the cure, it is recommended to regimental surgeons to attend to the diet of the men, to see that it is of good quality and served with regularity; above all it is necessary to take the greatest care that the men be under proper regulation with regard to liquor. They should have none that is not of proper age and quality, and the most anxious attention must be given that the quantity they receive is moderate, and that they have access to no more." . . . "Hospitals should be kept very clean, and should be well ventilated. The bedding of the sick should be as often as possible, exposed to the sun, the walls of the hospital be frequently whitewashed, and if contagious diseases prevail, it is recommended to try the fumigation of doctor Smyth, which is produced by mixing half an ounce of salt-petre with half an ounce of vitriolic acid in a sand heat. It is recommended to remove dead bodies from the wards as soon as possible, and to have the cloaths they used well washed and the straw of their bedding immediately burned." . . . "It is hoped that it is unnecessary to point out the necessity of keeping

the persons of patients very clean, as linnen at least twice a week, or oftener; on this subject, particular directions must be given to the servants of hospitals that the sick have the benefit and comfort that arises from clean apartments and cloathing; the hospital is never to be crouded, every man ought to have the space of six feet allotted to his bed." . . . "All surgeons should visit their hospitals daily or even more frequently, and keep a book of the admissions and discharges with particulars of the disease, diet and treatment; dissections of the dead body should be had recourse to as affording instruction which cannot be obtained during life. If a contagious fever or epidemic prevail the surgeon will give his opinion on the probable cause and whether such cause is removable; also the most successful mode of treating it, drawn not from books, but experience. The journals kept by surgeons will be undeniable proofs of his diligence and the best evidence of his abilities."

The two following G.O.s are suggestive of the customs of the time. One dated April 15, 1800, says: "The medical board, in the course of their examination of the numbers of unfits lately brought before them, have observed that the list of diseases on the return was very incorrect; many of the subjects being afflicted with complaints totally different from those inserted; and one man in particular in the 1st battalion, 5th regiment, was, in the opinion of the surgeon, unfit from the amputation of a leg, when in fact he had lost an arm; while others are reported incurable who are apparently fit for duty. The commander in chief attributes these contradictions to a great degree of negligence and inattention, and gentlemen in the medical line are therefore enjoined to observe the most scrupulous correctness in stating their professional opinions on men brought before them and reported unfit for service."

Another, dated September 2 of the same year, says: "The medical board having represented that the sick of native corps at the presidency are absent constantly from the hospital, the commander in chief directs that no patient be permitted to leave the hospital at any time without special licence, in writing, from the surgeon who attends him; any man found out of the hospital without such liberty chit must be confined, and on his recovery tried by a court martial for disobedience of orders."

II.

The steady recruitment of the Company's military forces was a constant source of trouble, and a number of Orders are to be

found dealing with this question. A Standing Order, dating from 1762, runs as follows: "Exclusive of the off-reckoning fund, the cloathing of all European recruits is to be furnished by the Town Major, who is to be allowed 16 rupees for each. Recruits on landing from Europe to receive 3 days provisions and to be furnished with a quilt each." In a G.O. of February 27, 1789, the Commander in Chief directs that every possible care be taken by the recruiting officers and captains commanding battalions of sepoys that no recruits be entertained that are addicted to drunkenness, thieving or other destructive vices on any account. On August 5, 1790, the following G.O. was issued: "Some of the recruits will be lads under 20 years, 5 feet 2 inches high, and other men between 20 and 30 years of age, 5 feet 5 inches; the standard at the commencement of the recruiting this season was 5 feet 3 inches for the former, and 5 feet 6 inches for the latter. This alteration we have thought necessary to apprize you of to prevent your discharging and returning to England any recruits, merely on account of their height; and indeed the great expence attending the levy and passage to India of the company's recruits must point to you the propriety of sending home as few persons as possible. When recruits arrive from England, the town major is to transmit to the officers commanding the corps among which they shall have been distributed, rolls of the recruits, specifying names, age, station, country, profession, ship on which embarked, and the time of arrival in India. Resolved, that at the recommendation of the military board, every native recruit enlisted by officers detached from the presidency, shall receive a bounty of three rupees. This regulation to continue in force until all native corps are completed to their establishment." This bounty was extended to the recruits enlisted at the presidencies by G.O. dated January 28, 1795.

In a G.O. of December 18, 1795, "commandants of native corps are directed to cloathe their recruits with the quantity of necessaries for which the established allowance of 2 rupees per man is granted and, so soon as they are enlisted, to encourage and attach them to the service by every means in their power." On April 4, 1796, it was notified that the bounty to foreigners enlisting in the Company's corps be increased from 30 to 50 rupees, and that on re-entering it be increased from 50 to 80 rupees.

In 1797, by a G.O. dated October 5, we find the following: "The ill success attending the recruiting service has induced the commander in chief to revise the existing regulations on that subject

and to formulate the following rules." One cannot quote the rules *in extenso* as they are long, but the following extracts will show sufficiently their intent. "In order to excite the zeal and exertion of the officers commanding regiments to complete their corps and keep up their full complement, General Stuart intrusts them with the whole management of the recruiting service, and confides the disposition of recruiting parties to their direction. The dispersion of those parties must depend greatly on the local situation of the corps, and not unfrequently on the connections of the men who compose it. The vigilant jealousy of the country powers and particularly of the Mahratta states, whose policy suspiciously marks the actions of strangers, has greatly circumscribed the latitude of recruiting, whereby this service has become less certain and more hazardous. This change of circumstance renders the greatest precautions necessary in parties to recruit, and such parties, if discovered, may be liable to punishment." . . . "To prevent disagreeable occurrences of this nature, commanding officers are directed to obtain full information how far the liberty of recruiting is restrained in the province before they send out any parties on this service." . . . "No person or party is to be longer absent on this service than six months, unless they may have obtained a great number of recruits and have certain prospect of obtaining more." . . . "Commanding officers will select the best men to be employed on the recruiting service, whether commissioned or privates." . . . "The number of men required for this service will depend on the circumstances of the corps, but under no circumstance is it permitted to send from one battalion more than one native officer, six non-commissioned officers, and twenty privates." . . . "Although General Stuart has used the words 'recruiting parties' he would by no means have it understood that he thinks the service would be promoted by sending men in a body, but rather to employ them either singly or in small parties under the controul of native officers to their respective countries, acting independently of each other. From the nature of the service, it is probable that a single person would have the best chance of succeeding, as more than one is likely to discover the purpose of the mission, which the present restraints and jealousies of the country governments render necessary to conceal; a discovery precludes all further progress." . . . "No recruits to be enlisted above the age of 30 years or under the height of 5 ft. 2 in., but those who may be received of so low a stature will be expected to be of robust make, or of an age at which there is a natural

probability of their growing. Fine young men, under the age of 20, may be entered of the height of 5 ft. 1 in. Commanding officers are on no account to enlist slaves, and they will be careful not to admit those who have lost their caste, or who are of a mean or disgraceful caste, or who may be of depraved characters." . . . "It is the commander in chief's design to afford every encouragement to the recruiting service, and as the very liberal pecuniary rewards held out have failed he would stimulate the zeal of those employed by the honourable reward of promotion. The effects of promotion are now to be tried." . . . "The following quota of men procured by the undermentioned ranks is to entitle the different descriptions of the native service to the respective degrees of promotion. Privates, on raising 3 approved grenadier recruits or 4 approved battalion recruits to be promoted to naique; naiques, on raising 6 approved grenadier or 7 approved battalion recruits to be promoted to havaldar; havaldars, on raising 20 grenadier or 25 approved battalion recruits to be promoted to jemmadar; jemmadars, on raising 40 grenadier or 45 approved battalion recruits to be promoted to subahdaurs. As there is no rank in the native service beyond that of subahdaur, a person holding this commission can only receive the sums mentioned hereafter in the 40th article for each approved recruit, in lieu of all claims." The 40th article here quoted gave 6 rupees for each approved grenadier and 5 rupees for every approved battalion recruit. "Approbation is not given to promotion without going through the regular gradation, but if, by extraordinary exertions, a sepoy, naique, havaldar or jemmadar shall triple their quota he may, on the particular recommendation of the commanding officer, be promoted in deviation of this rule. In all cases of this special promotion full particulars must be submitted to the adjutant general for the orders of the commander in chief. Such as engage to procure recruits for promotion are not to receive any pecuniary gratuity unless they fail in bringing the number they have stipulated for; in which case they are to have the same allowance as if they had entered into no engagement." . . . "The bounty of 3 rupees to be continued to every recruit who enters the service; together with the reward to every non-commissioned officer or sepoy of 2 rupees for each approved grenadier and of 1 rupee for each approved battalion recruit." . . . "Non-commissioned officers or privates assisting a recruiting officer shall receive full batta for the time they are employed on the service; but, if employed separately, to receive the same pecuniary reward as granted a native commissioned officer.

Inhabitants or others who may be induced to procure recruits are to receive the same sums for each man as regulated for the native commissioned, non-commissioned officers and sepoys."

By a G.O. of January 12, 1798, a certain Captain Skelton was appointed drill master and superintendent of recruiting for the Bombay side, and other officers, whose names I cannot trace, were similarly placed at Madras and Calcutta; all were under the adjutant general for these duties. On May 30 of the same year we find the following suggestive G.O. published. "The commander in chief is concerned to see enrolled in the native corps, as sepoys, so many boys and children, who are incapable of performing the duties of soldiers. . . . He directs that all such shall be discharged as are under the height of five feet; nor are any of that size to be retained unless they can prove they are related to an officer or soldier in the corps by consanguinity." In spite of all these regulations and orders, evidently great difficulties were experienced in getting recruits, consequently, we find the following G.O. issued on January 29, 1799. "Further to ensure success to the exertions of recruiting officers it is authorized to offer commissions to such respectable natives, being approved by government, as may engage to procure men for promotion, in the following proportion, namely, appointments to 6 jemadaurs, 12 havaldaurs and as many naiques. The jemadaurs to furnish 100 approved battalion men, or 80, if one half should be grenadiers; the havaldaurs 25, and the naiques 15 recruits; but in case of bringing the above proportion of grenadiers the former will be entitled to promotion for 20 and the latter for 10. Recruits obtained in this manner are to be without any expence to the company, and the parties are not to be entitled to any promotion until their contingents have passed muster at the presidency." In a G.O. of December 13, 1799, we read that "in consequence of the honourable company's commands the recruits arrived from England on the Albion and Woodland are to serve the honourable company for ten years."

III.

Concerning pay and allowances in these old times, very voluminous regulations existed; one can but quote a few of the more quaint or interesting. "Serjeants in garrison or cantonments not provided with quarters to have 4 rupees monthly for rent." "Officers dismissed the service or under suspension till the company's pleasure be known to be allowed one rupee daily till

the departure of the ship on which they are ordered to embark." "The European wives of European soldiers to receive 2 rupees monthly in cantonments, and 5 rupees monthly or half a ration of provisions in the field." "Assistant surgeons without rank to receive half batta as ensigns, and when employed on field service to receive the field allowances of ensigns." "As officers of detachments serving on board ships as marines receive the full batta of their rank, they are not entitled to the allowance 'passage money' nor to the captain's table." The following is somewhat quaint. "Officers losing a leg in the service to have an allowance of 30 rupees monthly for a palanquin." Another curious order runs, "the surgeons of Europe ships are allowed the sum of 4 rupees for each non-commissioned officer and private landed from the ship. From St. Helena, 2 rupees, and from the Cape of Good Hope, one and three quarter rupees. These allowances are also admitted for all wives and children. But when the regimental surgeon or assistant surgeon is on board, the surgeon of the ship does not draw anything." All the foregoing extracts are taken from the standing orders for pay which were current from 1774 to 1801.

The following are extracts from various General Orders of this period. One dated November 1, 1775, says: "Any officer, non-commissioned officer, or private man who receives money at the pay office, when he apprehends any of it to be bad, he is immediately to carry it to the shroff who will immediately weigh it and if found to be bad exchange it." On September 22, 1788, the following G.O. came out: "The established pay to officers of His Majesty's service being found to be in excess of that given to the company's officers, it is ordered that from August 1 the arrears of His Majesty's troops for one year shall be added to the subsistence money of 365 days, and the same converted into sonaut rupees at the rate of two shillings and one penny the rupee, to which sum, if it shall be less than the company's pay, such addition to be made as to render it exactly equal to the company's pay for 365 days, and this difference being divided into twelve parts shall be issued in monthly payments." The following G.O. of August 23, 1789, is characteristic of India. "The mode of conducting the casualties of the non-commissioned officers of the European regiments appearing to be attended with a double issue of pay for the period, it is directed that all succeeding non-commissioned officers are to receive pay only from the time the casualty ceases to be a charge to government. For example, if the vacancy happens by death before the 15th of the month, the man who

succeeds must only come on pay from the 1st of the ensuing month, as the pay of the man who dies is allowed to the end of the month for defraying the expences of his funeral, but if after the 15th instant, the commanding officers must regulate the periods when one ends and the other begins that no more than the original month's pay be issued." By a G.O. of September 14, 1790, it was directed that the following deductions be made from the pay of officers of the King's troops, namely, one day's pay towards the hospital at Chelsea, and twopence in the pound for agency. Formerly it was customary for agents to stop two days' pay for fees, but this charge was prohibited by 23rd Geo. 3rd, chap. 50. On this basis a surgeon's pay would work out as follows: Full pay at 4 shillings per diem is £73. His subsistence allowance at 3 shillings a day was £54 15s., and the difference between the two was £18 5s., known as gross arrears. If we deduct poundage of a shilling in the pound amounting to £3 13s., also one day's pay of 4 shillings for hospital and twopence per pound for agency on £73, we get his nett arrears to be £13 15s. 10d., this sum added to his subsistence gives his total emoluments to be £68 10s. 10d. This cannot be held exorbitant pay, while its mode of computation is typically like India of our day. By a G.O. of April 20, 1792, all officers commanding brigades were granted a daily allowance of 3 pagodas 5 fanams and 20 cash, at rate of 3½ rupees to the pagoda. Another of November 10, 1792, says: "The honourable the President in Council is pleased to allow each European private in the King's and company's regiments one rupee each for a covering during the cold season; but this is not to be considered as an annual allowance."

A G.O. of September 13, 1795, says: "Having considered the representation of the hospital board on the inadequacy of their salaries, we have agreed to the following augmentation; first member from rupees 12,000 per annum to rupees 16,000; second member from rupees 9,600 per annum to rupees 12,000." Another, dated May 25, 1796, says: "The general officers upon the staff are to receive an aggregate allowance of 1,830 rupees per month, in addition to their regimental emoluments as colonel, and their share of the profits from cloathing in lieu of all claims whatever, except for camp equipage for which and travelling they are to receive 400 rupees a month in peace and 1,000 a month when employed during war." On January 13, 1797, the salary to the agent of the company for the manufacture of gunpowder was fixed at 500 rupees a month.

On June 26, 1798, an order was issued that "the board concur in the recommendation of the commander in chief to enlist four musicians brought out by General Peché, as a basis of a garrison band for Bombay, and authorize the reimbursing him the sum of £42 for musical instruments, and agree to pay at the rate of two shillings and sixpence the rupee, to one musician £50 per annum, and to three ditto £40 each annually. The town major to be allowed to draw the amounts of their pay as privates, out of which he is to provide them with suitable cloathing and to account for the same. They are to remain under the directions of the town major, who will allot them separate quarters distinct from the barracks." On November 22 of the same year it was authorized that an allowance of one quarter of a rupee each day for Christmas, New Year's day, and the King's birthday be drawn for each man present with the corps on those days, except such as are in hospital. The same Order intimated that allowances known as arrack and wood money were stopped, and instead quartermasters could draw from the Company's stores one gallon of arrack monthly in the dry season and two gallons in the rains for every effective European non-commissioned officer and private on the day of muster. The arrack to be issued to such men as choose to take it on payment, in the quantity of 1 dram per day in the fair season or 2 drams in the rainy times. Officers drawing the arrack to receive at a gallon for 30 drams and to issue by a measurement of 32 drams to a gallon, the difference being an indemnification for wastage. The same Order lays down that the full rate of provisions on field service for European troops be three pence halfpenny for privates and three pence three farthings for non-commissioned officers, and stoppages be made accordingly. The details of the full allowance are given as 1 pound of salt meat or one and a half pound of fresh, one and a half pound of biscuit or rice in lieu thereof, 2 drams of arrack and a quarter of a seer of salt.

At this time the following allowances were authorized to officers for purchasing camp equipage when ordered on field service, the computation being for two years. Field officers, 1,600 rupees; Captains, 800 rupees; Subalterns, 400 rupees. Majors of brigade, quartermasters of brigade, adjutants, quartermasters, surgeons, and assistant surgeons in charge of regimental hospitals to have 300 rupees additional tent purchase, and 50 rupees extra tent carriage.

The rates of pay of the King's troops were revised and raised by Warrant in 1797; they were communicated to the Honourable Company in a despatch of January 25, 1798, and came into opera-

tion at once. The new system, though abolishing the old one of subsistence and arrears, was still complicated, owing to there being both King's and Company's pay, the former in sterling and the latter in rupees. If, after conversion into rupees, there was any difference between the two, that difference was either deducted from or added to the batta money which the Company gave in addition to its pay, and the whole added together. Deduction or addition depended upon whether the King's pay was greater or less than the Company's pay. The facts will be best understood if one gives details of all ranks. Thus a Colonel of cavalry got King's pay of £1 12s. a day and pay from the Company at 10 rupees a day. With the rupee at half-a-crown, this meant that the King's pay was 395 rupees in a thirty-day month, and that of the company was 300 rupees. The difference of 95 rupees between them was then deducted from the batta money. Batta for a colonel was 750 rupees; so the cavalry colonel drew 395 rupees as King's pay, 300 rupees as Company's pay, and 750 less 95 rupees as batta, or 1,350 rupees a month. A Lieutenant-colonel of cavalry drew as King's pay £1 3s. a day and 8 rupees daily as Company's pay; his batta was 300 rupees. On the same principle he, therefore, drew 780 rupees a month. The King's pay of a Major in the cavalry was 19s. 3d. a day and the Company's pay 6 rupees. His batta was 225 rupees. His monthly pay was, therefore, 585 rupees. The King's pay of a cavalry captain was 14s. 7d. a day; the rate from the Company was 4 rupees and his batta was 90 rupees. We find his monthly pay to be 330 rupees. Lieutenants drew 10 shillings a day from the King and 3 rupees from the Company; their batta was 60 rupees. From these data we find their monthly pay to have been 240 rupees. Ensigns drew pay from the King of 7 shillings and 2 rupees from the Company, their batta was 45 rupees, so their monthly pay worked out to 185 rupees. The King's pay of a surgeon in the cavalry was 11s. 4d. a day, the Company's pay was 4 rupees, and his batta 90 rupees. On the above principle his monthly pay was 330 rupees.

In the King's infantry the pay was worked out on similar lines, but the figures were different. Thus a colonel got £1 2s. 6d. a day from the King and 10 rupees from the Company; his batta was 750 rupees, and consequently owing to the King's pay being less than the Company's the difference of 30 rupees was added to his batta and his total monthly pay came to 1,350 rupees. So a lieutenant-colonel drew 16 shillings from the King and 8 rupees from the Company daily; these, with 300 rupees batta and 49

rupees added for difference gave him 780 rupees monthly. Majors got 14 shillings daily from the King and 6 rupees from the Company with 225 rupees as monthly batta. By addition of 11 rupees for difference this gave him a monthly pay of 585 rupees. The King's pay of an infantry captain was 9 shillings and 5 pence, that from the Company being 4 rupees daily; with 90 rupees for batta and 7 rupees for difference, this made his monthly pay to be 330 rupees. Infantry lieutenants drew 4 shillings and 8 pence daily from the King, and ensigns 3 shillings and 8 pence. Their Company's pay was as given for the corresponding ranks in the cavalry, and so was the batta. Their respective monthly pays were 210 and 185 rupees. The surgeon in the infantry drew daily pay of 9 shillings and 5 pence from the King and 4 rupees from the Company; his batta was 90 rupees, consequently his monthly pay came to 330 rupees.

In the Company's own troops the emoluments were pay and batta but no King's pay. In the infantry, colonels drew 1,140 rupees a month, the lieutenant-colonels drew 630 rupees, majors drew 510 rupees, captains 296 rupees, surgeons the same, lieutenants 168 and ensigns 129 rupees. These rates are all for thirty-day months and in garrison; when in the field the respective pays were 1,230 for colonels, 1,020 for lieutenant-colonels, 799 for majors, 436 for captains and surgeons, 254 for lieutenants and 200 for ensigns. All these rates of pay may seem lower than we should have expected to find them, but we have to remember that the purchasing power of the rupee was much higher than now, therefore these rates of pay went much further than they would do in these times.

IV.

The large number of non-effective men whom the Company constantly found on its hands and whom it could not readily get out of the country even had it wished to, was the subject of frequent Orders and Regulations. Its general policy seems to have been to keep them in the country and utilise them as a sort of reserve on which it could draw in times of crisis. Thus, a G.O. of September 30, 1785, says "The proceedings of a board of officers appointed to examine the invalid and pension lists having been laid before the honourable the President and Council, they have taken the same into consideration and established the following regulations. That the lists of invalids and pensioners, as framed by the said board of officers be admitted. That as many

of the invalids as are capable of bearing arms be formed into a corps under invalid officers, who are to be answerable for their discipline, make out and sign the monthly muster rolls, and report all casualties in the same manner as practised in the regular troops. That should the invalids exceed the number of eighty privates they must be formed into two companies. That all European and native commissioned officers, as also all non-commissioned officers and privates, that may be invalided from the sepoy corps be in future formed into separate corps, to consist of as many companies as there may be men to compleat each company to the number of fifty, who must fall under the same regulation as the other sepoy corps, and subject to such further rules as should be established for the european invalids. The whole of this corps to be placed under an invalid sepoy officer, who shall make his monthly returns and muster rolls, and report all casualties. That the invalids enjoy the same advantage as the other troops of being received into hospital when sick. That the agent for cloathing the troops shall cloath the invalids, and the usual stoppage be made for the purpose in the military pay office; that the profit arising therefrom for Europeans be paid to those captains who shall be appointed to the command of the invalid companies; and that those accruing from the cloathing of the invalid sepoys be paid to the captains who shall command the invalid sepoy corps."

By a G.O. of November 24, 1792, the strength of each native invalid company was made to be one Captain, one Lieutenant, one Ensign, two Serjeants, one Subahdaur, two Jammidaurs, six Havaldaurs, six Naiques, one Drummer, one Fifer and a hundred Sepoys. The serjeants were ordered to be drawn from the European invalids, and all other European invalids who were permitted to remain in India were to be attached to, mustered and paid in the first company. A G.O. of August 3, 1793, laid down that all native officers, non-commissioned officers and privates of the invalid companies who were unfit for garrison duty were to be reported upon by the military board, when the annual examination of the European and Native troops unfit for service takes place. The following G.O. of August 24, 1799: is suggestive: "H.R.H. the Duke of York having directed it to be intimated to the commander in chief in India that many inconveniences had arisen from officers who are sent home with invalid soldiers leaving the ships before their arrival at the place of their final destination, the C. in C. thinks fit to give the most positive orders to all officers returning home with invalid soldiers under their care, that

they shall on no account quit them until they deliver them personally to Major-General Fox at Chatham barracks, to whom they will make over the accounts of the men who have been under their care." A later G.O. of September 28, in the same year says: "all non-commissioned officers, drummers and privates who may be invalided shall receive the full pay and allowances of their rank. All native commissioned officers who may be recommended for the invalid list, shall remain on the supernumerary invalid list, on the half-pay of their rank, until vacancies happen in the invalid companies, when they will be appointed thereto as the commander in chief may direct."

V.

The following G.O. dated May 30, 1767, explains the origin of a fund on which our present day pension fund is built. It runs: "Copy of sundry paragraphs of a letter from the President and Council, at Fort William, dated February 24, 1767, received the 25th May following per Hormuz. Lord Clive, before his departure for Europe, having generously established a fund for the support of such officers and soldiers as have been or shall be disabled or superannuated in the service of the honourable East India company, and his lordship having to this noble and charitable purpose subscribed five lacks of rupees, which were left him as a legacy by the nabob Meer Jaffeer, and as the present nabob Syfo Dowla has since been pleased to add the sum of three lacks of rupees as an augmentation to the said fund, we take this opportunity of acquainting you therewith, that the officers and soldiers on your establishment may be informed of the same. Enclosed we transmit you the sketch of a plan by which Lord Clive proposes this fund shall be conducted." . . . "A sketch of the plan proposed by Lord Clive, for the distribution of the legacy left him by the nabob Meer Jaffeer, and of the present from the nabob Syfo Dowla in aid of his lordship's intended fund. The whole sum, amounting to eight lacks of rupees, to remain in the company's treasury at Fort William, bearing the usual interest of 8 per cent per annum. The annual amount of interest to be distributed in the manner to be mentioned, to such number of officers, soldiers and widows, as the money will admit of; the priority of whose claims to be settled agreeably to the dates of their certificates. No officer or soldier to be entitled to the bounty, unless he be disabled by wounds or other accidents, or rendered incapable by age or length of service. No officer or soldier is to be entitled to this

bounty who does not produce a certificate from his commanding officer, of his being disabled or rendered incapable of further service in India, or of his being an invalid, together with an approbation of that certificate by the Governor and Council. This bounty is only to extend to such officers as are obliged through any of the misfortunes above named to return to England, in indigent circumstances; every officer, therefore, applying for the bounty must make an oath in the most solemn manner before the Governor and Council to the following purport, namely, that he is not, in real and personal estate possessed of, if a Colonel, of £4,000, if a Lieutenant-Colonel, of £3,000, if a Major, of £2,500, if a Captain, of £2,000, if a Lieutenant, of £1,000, if an Ensign, of £750. Given these conditions, the distribution will be, to a Colonel £300, to a Lieut-Colonel £250, to a Major £200, to a Captain £150, to a Lieutenant £100, to an Ensign £70, to a Serjeant £20, to a Corporal £15, to a Private £10. The widows of these officers and soldiers who had pensions are to enjoy one half of the same as long as they remain unmarried."

In 1771, by a G.O. dated August 19, it was notified that the shares and proportions under Lord Clive's fund were to be "to all commissioned and warrant officers, one half part of the ordinary stated pay they were respectively entitled to, whilst in commission or service; to all serjeants, corporals, drummers and private men, the same pay as is allowed to out-pensioners of the same ranks belonging to Chelsea hospital. And to the several widows of all such officers and soldiers, one quarter part of the ordinary stated pay their respective husbands were entitled to when in the honourable company's service. This allowance to continue only during their widowhood." In 1772, by a G.O. of September 4 it was notified that by the regulations of Lord Clive's fund "a serjeant of artillery who may become an invalid and is sent home, is to receive nine pence per day and such as have lost a limb one shilling per day; a private man of artillery, sixpence per day, or if he have lost a limb, ninepence per day; all other non-commissioned officers and private men to receive 4¾d. per day. The widows to receive the same pensions as heretofore." A G.O. of March 8, 1780, calls attention to the fact that all officers and soldiers who become pensioners upon, partake or receive any allowance or benefit from the military fund or Lord Clive's fund relinquish totally every pretension to the Company's service. Certain irregularities having occurred whereby unauthorized persons had gained benefits from the Clive fund, it

was notified in a G.O. of June 3, 1783, that "particular attention be paid to the circumstances on which persons ground their claims, and that no commission of superior rank be granted to any officer for the purpose of claiming a pension." In support of this Order, elaborate rules were issued to check impostures and to control the pension list, a special officer being appointed to inspect and report on the condition of each person residing in the various districts. A G.O. of December 4, 1787, says "all European pensioners when guilty of disorderly behaviour or disrespect to any officer shall be tried by martial law and punished at the discretion of a court martial."

In 1799, the question of abuses of the pension list again cropped up and new regulations were issued; one cannot give them in detail, but merely quote the following: "No pension is to be paid to other persons than the pensioners themselves, except in cases of inability to attend; of the reality of which the inspector of the pension list will be careful to inform himself. Pensioners absent, or of which no satisfactory account can be given to the inspector, to be struck off the list, and not to be replaced but by an order of the commander in chief." The same rules give the following rates of monthly pay to native pensioners. To Commandants 50 rupees, to Subahdaurs 24 rupees, to Jemmadaurs or Syrangs 12 rupees, to Havaldaurs, drum and fife majors and artificers 6 rupees, to Naiques, drummers and fifers 5 rupees, to Sepoys, lascars, puckaulies and topasses 4 rupees. To the widow of a Commandant 20 rupees, of a Subahdaur 10 rupees, of a Jemmadaur, of a Syrang 6 rupees, of a Havaldaur, drum or fife major or artificer 4 rupees; to widows of Naiques, drummers and fifers, of Sepoys, lascars, puckalies and topasses 3 rupees. Children of both sexes under 12 years of age, each got 1 rupee monthly, and orphans of either sex if under 12 years of age 2 rupees. For the European pensioners, remaining in India, the monthly rates were, to Serjeants 18 rupees, to Corporals 13 rupees, to Gunners, Matrosses, or Privates 10 rupees. The widows of Serjeants got 6 rupees, those of Corporals, Gunners, Matrosses or Privates the allowance was 4 rupees a month.

VI.

Concerning retirements, one finds the following G.O. dated May 26, 1796: "That every officer, after twenty-five years in India, three years for one furlough being included, be allowed to retire with the pay of the rank to which he may have attained; but

it must be understood that such pay is to be the same only as that allowed to officers of infantry. That every officer returning on furlough, and wishing to retire from the service, being qualified as above, be required to make a declaration to that effect within twelve months of his arrival in England; in case he neglect to do so, he must, at the expiration of his furlough, either return to India or be held to have relinquished the service, and not be entitled to retire on the pay of his rank. That a member of a medical board who shall have been in that station not less than five years, and not less than twenty years in India, including three years for one furlough, be permitted to retire from the service, and allowed five hundred pounds per annum. That a surgeon of a general hospital who shall have been in that station not less than five years, and whose period of service shall not have been less than twenty years including three years for one furlough as above, be permitted to retire from the service and allowed three hundred pounds per annum for life. That all other surgeons and assistant surgeons attached to the military, be permitted to retire from the service on the pay of their rank, after having served in India not less than twenty years, including three years for one furlough. Having thus detailed to you the new arrangements we have thought fit to adopt for our army in India . . . . we entertain the most sanguine expectations that all future cause of discontent will be effectually done away, and that our military officers of every description, will feel duly impressed with a sense of the protection which has been extended to them . . . . in thus providing for a relaxation from the toils and fatigues attendant upon the profession of arms, and finally, by the provision made for them at the period of their retiring to their native country. We are aware that in a subject so extensive and complicated, notwithstanding the pains we have bestowed upon it, some errors may have crept into the preceding arrangements; . . . . we trust our military servants of every rank will consider, with candour, the great and important variation which is now made in the service of our army in India, and if any one or more individuals should feel their own situations are not exactly what they wish, they ought to balance the whole together, and recollect that the whole service in general has gained in point of credit, emolument and respectability, by the arrangements we have now made." In elaboration of the foregoing Order, detailed regulations were issued; the only points in them which call for notice are, that pensions were to be drawn in arrear, at Midsummer

and Christmas, and that in support of claims to draw the pensions certain certificates of identity had to be submitted.

In 1799, a G.O. dated July 31, appeared which ran as follows: "That military chaplains after eighteen years in India, three years for one furlough being included, shall be allowed to retire from the service. That the pay to military chaplains so retiring be the same as that allowed to them when on furlough, namely, captain's pay, or ten shillings a day. That no chaplain be allowed to retire on such pay, who has not served ten years in India at a military station. That no chaplain be entitled to retire on such pay who does not produce ample testimonies of his having done his duties as a clergyman faithfully and diligently, and also of his good conduct and behaviour in general, such testimonial to be transmitted through and with the opinion of the government under which they were serving." The same Order then goes on to say "That without requiring any specific period of service, every officer who has, by regular promotion, obtained the rank of lieutenant-colonel, major, captain, or captain-lieutenant, and whose ill state of health renders it impossible for him to continue to serve in India, be allowed to retire from the service on the half pay of his rank." This concession was in response to complaints that the original terms were not elastic enough. A further paragraph of the same Order says: "If an officer whose constitution may not permit him to support the climate of India for a period sufficient to obtain promotion above the rank of subaltern, we have agreed to allow a lieutenant in this predicament, after having served thirteen years in India, and an ensign, lieutenant fire-worker, or cornet, after having served nine years, including each a furlough of three years, to retire on the half pay of their respective ranks. If an officer of the rank of lieutenant whose constitution may be so impaired as to prevent the possibility of his continuing in India, has not served the period prescribed above, he may be permitted to retire from the service on the half pay of ensign." Another paragraph in the same Order says: "In order to prevent inducements to officers to resign the service by the clandestine sales of commissions, we think it proper to direct that every officer who applies for leave to retire on the pay or half pay of his rank, shall declare upon oath, that neither he himself or any other person for him, to his knowledge, has received or will receive any compensation or gratification, pecuniary or otherwise from any person or persons whatsoever for such retirement." The rest of the clause entails, in the event of disobedience to this order, that the officer who receives compensation for retiring will be

cashiered and the officer offering compensation will not receive the benefit of the step in promotion.

In a G.O. of August 28, 1800, we find the following: "The period of service for officers to entitle them to retire on their full pay is to be calculated with respect to cadets, appointed here, from their arrival at the presidency to which they are appointed; in all cases the time served in India as cadets is to be included, and their actual service in India is to be twenty-two years. If a cadet appointed from Europe, and on his way to the presidency to which he is nominated, shall be put on actual duty at any other presidency where he lands, the period of his services in India is to be computed from the time of his being so employed. In every case officers must have served actually twenty-two years in India before they can be allowed to retire on the full pay of their rank; for although they may have been on the army list a longer period than twenty-five years, yet if by repeated furloughs their actual residence has been short of two and twenty years they must compleat this period before they can be allowed the benefits of the regulations on that head."

VII.

It is curious to find in these old Orders evidence of the present-day question of passage money home. We grumble now, but the grievances and difficulties in getting home were infinitely worse in the times to which these papers relate. The following is an extract from the Standing Orders for passages dated 1779. "For officers ordered from one station to another or on duty on board ship, 3 rupees daily for each, payable for the actual number of days to the commander of the vessel where a table has been found, or to the officer himself should he have embarked on a boat; but where field allowances are granted, the company incur no expence for passage money. The money paid to the commander of the vessel in this case to be deducted from the officer's allowances." Owing to complaints from home that numbers of natives of India were found in indigent circumstances in England, the same having gone home as servants with officers, it was ordered in a G.O. of July 28, 1788, that before an officer could take home a native servant, he must deposit in the treasury £50 for the maintenance of such black servant and passage back again. A G.O. of May 18, 1790, intimates that in future no passage money would be granted to officers of the King's troops for returning to England, except on the regiments to which they belong being ordered to Europe. This order was repeated in 1797, evidently owing to petitions for the concession;

the argument of the company was that they gave no passage money home to their own officers and therefore saw no reason why they should do so for the King's officers.

In 1798, a G.O. of September 30, says, "That it is resolved that the commanders of ships in the company's service be permitted to receive, but on no account to exceed, the sum of one thousand rupees, for the passage and the accommodation at their table, of such subaltern officers, assistant surgeon and cadets, as may be ordered to return to Europe, expressly for the recovery of their health." This indulgence was extended to subalterns of the King's regiments, in like circumstance, by G.O. of January 5, 1799, but it was at the same time intimated that the privilege would not apply to subalterns of the Company's army who left India prior to June 1, 1797.

In a G.O. of July 7, 1800, the following rates were promulgated as equitable passage money to be demanded by the commanders of country ships from individuals proceeding on leave of absence for their health, or on their own private concerns. All the rates are from Bombay, namely, to the Malabar coast 80 rupees, to Ceylon 100 rupees, to Madras 120 rupees, to Calcutta 200 rupees, to Malacca 150 rupees, to Fort Marlborough 200 rupees, to China 300 rupees. About this time there seems to have been complaints from the commanders of vessels as to the rates for passage money paid by the Company for transit of officers of the King's troops who were sent home. The following revised rates were accordingly laid down in a G.O. of December 22, 1800, as between Bombay and England, namely, for a General £250, for a Colonel £200, for a Lieutenant-colonel or Major £150, for a Captain £125, for a Lieutenant or Ensign £105. We grumble at the P. and O. rates now, but the above rates were much higher and the standard of comfort given in return much lower.

VIII.

There remain a few notes from General Orders which refer to a variety of topics, and which one has labelled "miscellaneous." It may be of interest to the reader to give a few extracts. A garrison order in Bombay, dated April 19, 1799, runs "The commandant of the garrison is surprized to hear that any officer should deviate from the orders for marching off the guards of this garrison. He directs that these orders be conformed to by the captain of the main guard in the strictest manner, who is not to make any addition of his own. The captain of the main guard, a

the executive officer on duty, will have his sword drawn until the whole of the guards have marched past him. He is to return the salute of the officers with his sword, and not by the compliment of the hat." Another from the same garrison, dated, January 7, 1800, says: "The officers who have been guilty of quitting their guards are desired to discontinue this un-officerlike and un-military practice, or they will take the consequence of disobedience of orders and neglect of duty, as major general Bowles is determined to use the means in his power to enforce obedience. An officer is not to quit his guard either to go to his meals, or for any other purpose unless ordered. He is to devote his whole attention whilst on duty to a faithful discharge of the trust reposed in him." Here is another one, also from Bombay, dated May 2 of the same year. "The acting president has been concerned to receive very serious representations of the highly imprudent conduct of officers in running their horses at full speed along the esplanade, by which those who occasionally walk there have been exposed to the danger of being thrown down and trampled upon. This practice is strictly forbidden, and all persons are positively enjoined not to ride or drive between the glacis and the regular roads on the esplanade, as a contrary conduct is not only in violation of Government orders, but endangers the safety of the public, and occasions considerable expences to the honourable company in frequent repairs." It is legitimate to assume that the last clause of the foregoing order was the real cause of its being drafted. The following of May 24, 1801, in Bombay garrison orders is suggestive of the times: "The commissary is desired to place weather chests in proper places, with every thing requisite to secure the ammunition in case of rain; and is further directed to see personally that the several furnaces on the works for heating shot are in compleat order. A sufficiency of ball ammunition is to be delivered to each corps, and lodged in a secure place under charge of the quarter master, with a sentry over it, and covered with tarpaulins to prevent its being injured by the weather."

The following extracts from General Orders refer mainly to the vexed question of rank. One dated June 7, 1777, says: "The honourable the President and Council have been pleased to direct that the order subjecting the jemmadars of sepoys to the command of the serjeants be annulled, and that in future, in all commissions granted to subahdars and jemmadars, a clause shall be inserted subjecting them to the command only of European commissioned officers."

The constant bickerings and ill feeling between the Company's officers and those of the King's troops culminated in the promulgation of a G.O. on September 19, 1788, from which the following is an extract: "Copy of resolutions passed by the Governor General in Council on August 1, 1788. Resolved that it be published in general orders to the army, that His Majesty, by a warrant under his sign manual, has been graciously pleased to authorize the commander in chief to grant brevet commissions of King's local rank in India, to all officers in the service of the honourable company, of the same degree as they now hold in the company's service, but the commencement of that rank is not to extend, in any case whatever, beyond the publication of the cessation of hostilities between England and France at Cuddalore, namely, the 9th day of July, 1783; and in all instances within that period is to correspond with the dates of their present commissions. The commander in chief is also empowered to grant similar brevet commissions to all the company's officers who may in future attain appointments or promotions in the regular course of their own service. Resolved, that it be likewise published in general orders that His Majesty, from a desire to remove all grounds of complaint, from the company's officers for supercession in rank by officers in his own service, has also been graciously pleased to direct that such of his own officers, as at present enjoy brevet local rank in India, shall wave the exercise of that rank after the 29th day of September, 1789, and shall confine themselves after that day to the rank which they hold by their regimental commissions, or by commissions which gave them general rank in the army." . . . "The members of the board concur entirely in opinion with the Governor General, that the example shown by His Majesty in directing that such of his officers as hold local rank in India shall wave the exercise of it, after September 29, 1789, should be followed without hesitation on the part of the honourable company by recalling all commissions or appointments to local or temporary rank, but particularly those which would place any of the officers above colonels of the King's service who enjoyed the rank of colonel before the 9th day of July, 1783. Resolved, that the general operation of the principle will be indispensably necessary to coincide with His Majesty's gracious desire of preventing future uneasiness and jealousies betweeen the two services."

In a G.O. of September 2, 1790, we read, "Conformably to a passage in the company's military arrangements communicated in their letter of September 15, 1785, majors of brigade, being

subalterns, are to have rank as youngest captains of the army." The following G.O. of March 20, 1791, reads quaint in these days: "That no doubt may be entertained with respect to the precedency of the flank and grenadier battalions, the commander in chief is pleased to direct that the flank battalion, as a corps with Europeans attached to it, shall take the right of the grenadier battalion, but on all duties where the native troops of the flank battalion and the grenadier battalion meet, the grenadier battalion shall have the precedency." Two days later the following G.O. came out: "As Lord Cornwallis has ordered that the troops of Bombay and Madras, when serving together beyond the bounds of either presidency are to draw lots for the right, this mode is now to be followed; and the commander in chief is pleased to direct that captains Wahab and Mignan meet tomorrow morning at 9 o'clock at the deputy adjutant general's tent for that purpose."

Evidently the friction between the Company's and King's officers as to rank and precedence had not been finally settled by the earlier order as we find this G.O. of May 25, 1796, which formulates instructions received from home bearing date of January 8, 1796. "Having thus detailed the new peace establishment, we have great satisfaction in acquainting you, that in order to prevent the existence of jealousies between the King's and Company's troops, the right honourable Henry Dundas, one of His Majesty's principal secretaries of state, has engaged to recommend to His Majesty to give to every officer of the company King's commission of the same date with that which he receives from the company, with a retrospect founded on the date of the King's commissions they now hold, so as to prevent supercession by the various recent promotions by general brevet which have taken place in His Majesty's army." The outcome of the above was that all the Company's commissions were antedated to January 8, 1796, by a G.O. of January 17, 1798. On January 5 of the following year we find this G.O.: "The honourable court of directors have directed that promotion in the army proceed upon the principle laid down in their letter of January 8, 1796, with the following qualifications; that in the infantry the officers be promoted by seniority in their respective regiments to the rank of major, and afterwards to the higher ranks by seniority in the whole corps. This arrangement will be carried into effect in the following manner. The 8 senior majors to be posted according to their seniority in the different regiments, reckoning the european regiment the senior, and the marine battalion the junior corps. To the first, as major

will be appointed the 9th major, to the first, as captain the 1st captain, and as captain-lieutenant, lieutenant and ensign, the 1st on each of those lists, observing the same order in respect to the rest. That the cadets whose rank remains unadjusted by the court of directors, be posted to regiments according to the temporary order in which they now stand, and the relative ranks of those placed in the same regiment be hereafter adjusted according to their standing on the court of directors' list." Owing to dissatisfaction expressed as to the above order, it was held in abeyance till the end of 1799, when on December 18, this G.O. came out. "The reason that induced the Governor in Council on July 9 last to suspend the operation of regimental rise being done away by the arrival of the honourable court of directors' commands on the subject, the lists of cadets for the years 96 and 97 having also been received, and all vacant commissions in the infantry being now filled by promotion, resolved, that the regimental system do take effect in conformity to the principle established by the Order of January 5, 1799. Resolved, that officers below the rank of major, of the same remove from promotion, be permitted to exchange with each other for the limited period of two months from this date, after which period officers exchanging must go into regiments, the youngest of their rank." In spite of the above Orders, regimental posting and promotion seems to have been opposed, for we find another reference to the question in a G.O. of March 22, 1800, in the following words. "Whilst the Governor in Council has, from a motive of equity, which he doubts not will be felt by the whole army, resolved thus far to dispense with his order December 18 last, and which is, of course, not meant to affect the few intermediate promotions that have occurred, he thinks it proper to announce that nothing in future shall induce him to deviate from a principle so manifestly adapted to the promotion and advantage of the army at large, and that the fixed system of regimental rise is to have invariable effect from and after this date, agreeable to which the posting of officers to corps is to be considered definitive and final."

The following G.O. of November 23, 1783, is of historical interest. "The 8th battalion of sepoys having been composed originally of grenadiers, and always distinguished themselves by the most steady and exemplary valour and discipline, and their good behaviour during the late siege of Mangulore, having been highly commended by general M'Cleod and colonel Campbell, the honourable President and select committee have been pleased to

direct, in consideration of their good services and solicitations for this honour, that they again be established into a grenadier corps, to be called 'The Bombay Grenadiers,' and that captain George Dunn, whose gallantry and good conduct have been particularly noticed by colonel Campbell, be confirmed in the command of them." This corps still exists as the 101st infantry, and the old 8th sepoy regiment from which it originally sprang, by the above quoted Order, was made up by a G.O. of November 12, 1779, from a grenadier company each from the then 1st, 2nd, 3rd, 4th, 5th, 6th, battalions of native infantry, and two grenadier companies from the marine battalion.

The following G.O. of April 23, 1789, is quaint: "The President in Council directs as it sometimes happens that sepoys die without heirs to claim their arrears to perform their funeral rites, and the arrears in such cases fall to the company, that the commanding officers of battalions be allowed 4 rupees for each man under this description, for defraying the expence of the proper ceremonies according to their different castes." It is interesting to note that the same sum was authorized for the funeral expenses of European soldiers.

In view of some recent orders in our time, it is curious to find the following G.O. of September 25, 1768: "The native officers in general commanding the sepoys having complained that several of their people have often been beaten and abused by the European non-commissioned officers commanding guards, it is positively ordered in future that no European officer, or non-commissioned officer strike or abuse those very useful people, who are to be considered in every respect as other soldiers are, and when guilty of disorders or neglects are to be confined and tried by their own court martials."

As illustrative of the existence of a friction, similar to that not unknown in our own days, between military officers and those of ships, the following extract from a G.O. of June 28, 1794, is notable: "As the officers in the honourable company's military and marine corps hold their commissions by virtue of the same charter, we cannot allow the officer of one corps to enjoy a privilege that is denied to those of another, as that would be contrary to all rules of reciprocity, and establish a distinction of the most degrading nature to the officers of the marine corps, who deserve every protection from the government, in a point of this delicacy. We are, therefore, of opinion, as captain ——— of the marine was not allowed to prosecute lieutenant ——— of the army at the court

martial, that lieutenant ——— of the army ought not to be allowed to prosecute captain ——— of the marine at the court of enquiry; but that the superintendent be directed to prosecute captain ——— on the complaint of lieutenant ———. We cannot but express our surprise at lieutenant ———'s extraordinary assertion 'that a committee of enquiry is not established by any existing law,' as he ought to know that the honourable company have a right to make bye-laws, as well as to make regulations for the government of their settlements in India, to which, while he is in their service, it is his duty to conform; and courts of inquiry for trying officers in the marine have been established with the approbation of the honourable company." Again in a G.O. of October 23, 1795, we find these instructions to commanders of the Company's vessels for the information of army officers and others: "If at any time an ensign or other commissioned officer should be put on board your vessel to command the detachment, he will have orders to frequently exercise the soldiers; and if you find he neglects this service once a week, when the weather is fair and the occasion is proper, you are modestly to put him in mind of his duty, but not to use harsh measures to force him to a compliance; reporting only on your return any omission of this sort that he may have been guilty of." . . . "When any soldier commits a fault, his punishment must be agreed upon by you and the said commissioned officer of the military, and not inflicted without his consent; that thereby order and good harmony may be kept up and preserved between the marine and military people." The need of definite relative rank between the military and the marine officers was recognized in 1799, as we find a G.O. of May 3 of that year lays down that the commodore have equal rank with army colonels, the captains of vessels of 28 guns and upward to rank equal with lieutenant-colonels, and the captains of smaller vessels with majors; the first lieutenant to rank with army captains and the second lieutenants with lieutenants. In all cases the dates of the respective commissions to regulate the precedence. The superintendent of marine was deemed to be a civil official with precedence next to members of council; the master attendant was given civil rank next below the superintendent, and to sit above the commodore when they are acting together.

The next few extracts are of a mixed nature. Thus, a G.O. of November 20, 1765, says: "As some serjeants and soldiers are suspected of lending money to the soldiers and extorting unresonable interest for the same, it is ordered that no money shall be lent

among them on interest; and whoever is found guilty of the like shall lose the money so lent, and be punished for disobedience of orders." Again, one of June 30, 1766, says: "Some soldiers having lately deviated from the intent and meaning of the publication touching the straying of hogs, about the town (Bombay), all non-commissioned officers and soldiers are ordered to observe that all persons have permission to lay hold of, kill, or destroy any hogs that may be found strolling loose within the walls, but such hogs are to be carried before any one of His Majesty's justices of the peace and to be distributed as he shall think proper; no persons are allowed to let loose, or enlarge, any hogs from their owners styes, and any soldier or other found guilty in the breach hereof, will be punished for disobedience of orders." From Madras, we quote this G.O. of September 24, 1768: "The pew heretofore occupied by the infantry and artillery officers being much too small, the honourable the Governor and Council have been pleased to allot the two adjoining pews, which were formerly occupied by the company's writers, to be solely for their use; but the commanding officer of the troops for the time being, if a field officer, may if he chooses sit in the pew of the councillors. The non-commissioned officers are to sit on benches with the private men, and not in pews, that they may be answerable for their behaving decently, and reporting such who may behave otherwise."

As illustrative of the autocratic nature of the Company's rule in India, the two following extracts are striking. A G.O. of April 10, 1781, says: "The honourable court of directors intimate that in addition to what was written in their letter of April 6, 1770, we now direct that no person sent, or may be sent, to India, in our service, either as writer, cadet, or otherwise, be permitted to resign in order to adopt any other mode of employment, or to engage in any other line of business, incompatible with the said service; but whenever any person shall resign as aforesaid, he or they must proceed to England, for we will not permit any person to remain in India after resignation of our service, without having first obtained our leave for that purpose." Another G.O. of October 27, 1782, says: "The company's servants and other British subjects resident in India, are prohibited lending money to foreign companies or foreign European merchants, and from purchasing goods on their account, and from being concerned in such transactions, and from giving credit by bills of exchange on persons in Europe." Even the trade in tobacco was limited, as shown by a G.O. of July 26, 1790, which says: "The President in Council directs that

all persons who import tobacco for their personal use, shall be accountable to the tobacco farmer for permitting to pass the same, at the rate of seven rupees the Bombay maund, of tobacco brought from Persia, and nine rupees for country tobacco; but no person will be allowed to import above four maunds annually."

In closing one's notebook, one wonders whether anyone will be interested in these somewhat voluminous extracts. One can but hope that the trouble has not been taken in vain. Certainly, to the student of military history, these odds and ends should appeal, and, even to the casual reader, their subject matter should not be without interest. One has been struck with the language used in these old orders, and also by the fact that many of them refer to matters which in our time would not be honoured by a General Order; but, in the older days the administration was necessarily loose and very centralized; moreover, there were none of the codes and regulations which govern all our official acts in these days. If nothing more has resulted from the transcription of these notes than the giving a glimpse into how they managed affairs in the late years of the eighteenth century, one has, perhaps, not altogether wasted one's time.

MILITARY GREAT-COATS.

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Most nations carry this article of clothing in addition to the actual clothing worn on the person; there are, however, exceptions to this rule, as the French and Spaniards (in winter) wear their great-coats always as a part of their ordinary clothing. This custom also obtained in Italy until very recently. The Americans do not as a rule carry a great-coat, but replace it with a poncho and a blanket. The Norwegians have actually given up a great-coat altogether and have substituted a thick sweater and sleeping bag in its place.

In designing a great-coat for infantry there are many difficulties to be overcome. At present such a coat must be suitable to wear in peace time as well as on service, and must be a garment that will not hold a man up to ridicule. It is an expensive article and economy has to be studied in choosing the material. There are other difficulties which will be dealt with in turn.

Material.—The garment being carried primarily for warmth, the material should be of wool on account of its well-known properties. The rain-resisting properties apart from any waterproofing process depend on the milling—the heavier milled the cloth the more resistant it is to rain. The old dark blue cloth (4 B) used in the manufacture of Cavalry and Royal Artillery cloaks and great-coats was a very efficient water repellant material.

Waterproofing of the Material.—Great Britain stands alone in making a practice of subjecting the great-coat material to such a process.

The acetate of lead and alum process is the basis of nearly all the methods adopted to render cloth impervious to rain. The solution is said to destroy temporarily the capillary attraction of the wool fibres. The increase in weight caused by this process is very little, being usually estimated at one half per cent, or half an ounce per coat.

Some additions to the solution are made by different firms to increase the value of the process, but the nature of these is not usually divulged. In some cases glue is added, in other cases tannin. Other makers adopt a system of impregnating the fabric

with paraffin wax in one way or another, but this cannot be applied satisfactorily to woollen goods.

Some of the Waterproofing Methods.—(1) Hiller [1] describes the acetate of lead and alum process as follows:—

It is best carried out in a shrinking department of a factory, as the hot moist vapours evolved during the hot pressing of the cloth open up the wool fibres and render them more capable of absorbing the chemicals. The cloth is placed still warm in a freshly prepared solution of acetate of alum which is 0·8 to 1·2 per cent strong. This is prepared by dissolving 333 grm. of sulphate of alum and 567 grm. of lead acetate each in 10 litres of water and then mixing them. A white precipitate of the acid sulphate of lead is at once formed which sinks to the bottom. The clear upper fluid is decanted off, giving approximately 20 litres of a 1 per cent solution of acetate of alum. The material is then dipped in this solution for one hour and then removed, the excess of fluid being allowed to drain off. Next the stuff is passed through clean water to remove all the acetate still remaining between the fibres. It is then hung up in a dark, well-ventilated room to dry. A deposit of acetate of alum forms on the wool fibres and adheres firmly to them. During the drying process water and acetic acid are given off and as a result the acid acetate of alum is changed into the basic salt which has a less strong acid smell than the acid salt and gives to the fibres the water-resisting powers. Hot ironing of material thus treated must be avoided as heat will decompose this basic salt, leaving nothing but a fine powder of aluminium oxide. The water-resisting powers of material thus treated can be enhanced by putting it when dry into a solution of isinglass, 5 grm. to the litre, or a solution of gelatine, 6 to 8 grm. to the litre.

(2) Dujardin's [2] solution for waterproofing:—

Alum	10 grm.	Solution A.
Acetate of lead	10 ,,	
Potassium bicarbonate	6 ,,	
Sodium sulphate	6 ,,	
Water	1,500 c.c.	
Soft soap	4·5 grm.	Solution B.
Water	1,500 c.c.	

The material is first placed in solution A, then dried and removed to solution B.

(3) Cathories' [2] method of waterproofing:—

(*a*) The material is placed in a 3 per cent solution of sulphate of alum for ten hours.

(*b*) Next in a soap solution of the same strength as solution B of Dujardin's method.

(*c*) Dried.

(*d*) Then placed in a solution made up as follows:—

Paraffin fusible, at 53° C.	2 parts.
Vaseline	1 part.

25 grm. of this mixture are dissolved in 1 litre of petrol.

It has been suggested that the natural wool fat of wool should not be removed as it is Nature's protection of animals against rain, and the waterproofing methods using paraffin as part of the process are an imitation of this. In practice it has been found that when natural grease is left in the material cloths cannot be stocked for long owing to the decomposition of the oil which renders the material sour, mouldy, and covered with spots, and gives it an offensive smell.

It should be borne in mind that the great-coat is intended primarily for warmth and that the waterproofing is a comparatively modern idea. Such procedures have been adopted chiefly because when a coat is soaked with water its protective power against cold and its permeability are diminished and its weight considerably ncreased.

If a material is rendered quite waterproof it loses its permeability completely, which is most undesirable, and all that can be aimed at is to obtain a showerproof great-coat. By treating cloth by Hiller's process there is very little loss in the permeability; in fact, Munson, quoting Hiller, states that the "unimpregnated fabric allowed in a given time 54 litres of air to pass through, and if the cloth was waterproofed 52·98 litres passed, showing a very slight difference. The same cloth unproofed and saturated with water allowed only 14·9 litres to pass and the saturated treated cloth allowed 39·8 litres to pass."

However well showerproofed a cloth may be, water will percolate through the seams of the garments, and in heavy rain drops will be driven through the cloth on the shoulders of the coat. If the wearer is marching or riding in rain, friction or movement of any particular place removes the protective substance and allows rain to soak through the cloth. There is no doubt that with wear, coats so treated soon lose their showerproof qualities. The process is, however, very cheap.

Shape.—A certain amount of overlapping in front tends to give more efficient protection, so that some compromise between a double and single-breasted coat is desirable. A short coat after

the style of the British-warm coat so popular in South Africa is good, but if a long coat is preferred it should not reach below the centre of the calf and the skirt in front should be made to button back. Cuffs which turn down are to be avoided as they collect dust or water according to the weather conditions. The best way of affording warmth and protection at the wrist is to have a band which can be tightened up. A cloth belt round the waist is a useful adjunct, as by fastening it the belly can be kept warm. Most coats have a strap and buckle at the back, but a belt is probably better. The common falling collar buttoning up across the throat by a tongue need not be too high if a linen hood be added which collapses and folds in between the two layers of the collar. The Germans have such a hood, and when it is in position on the head the ordinary headgear can be worn. Such a hood is worn not only for sleeping purposes, but also to prevent water from running down the neck. The coat should fit loosely to avoid impeding the movements of the body, and should leave between it and the next garment a thin layer of air which will assist in preventing heat loss.

Great Britain.—We do not hear of great-coats or cloaks being used in the British Army until the reign of Elizabeth [3].

The fact that these articles are a serious weight for the soldier to carry has always troubled commanding officers; it is recorded that General Lord Pembroke [4] ordered the tails of the great-coats and cavalry cloaks to be cut off to lessen the weight of equipment of the troops under his command in Spain during the reign of Queen Anne.

Walton [5] says: "There is no evidence to show that what are now termed great-coats were issued to the infantry soldier earlier than 1685 or 1689, and there is evidence that they did not form a regular portion of the equipment although 'centry-gowns,' or in modern phrase watch-coats, were supplied and kept in repair at the expense of the Crown for the use of the men in inclement weather and at night."

The men were not provided with great-coats at the public expense until 1798 [6], when for the first time the whole of the troops were given coats, but it was left to the colonels to maintain them out of the allowance granted for watch-coats. These watch-coats were supplied gratis to the troops. One shilling a year per man was allowed to commanding officers for these watch-coats, but after 1798, by the abolition of lapels, twenty pence were saved on the price of a soldier's coat and given for the purpose of keeping up the great-coats provided by the State. It was not until 1855 that

Royal warrants relieved the colonels of regiments from supplying the clothing of the men [7].

In 1858 the first officially manufactured great-coats were issued to the Army; they were made of Irish frieze.

MILITARY GREAT-COAT (WEIGHTS).

Country	Pattern	Actual weight of College specimen			Other weights given			Authority
		grm.	lb.	oz.	grm.	lb.	oz.	
Great Britain (Past)	1762. Grenadiers	..	..	..	2,324	5	2	Fortescue.
	1832	..	..	..	2,466	5	7	Marshall.
	1851	..	..	..	2,324	5	2	Napier.
	1860. Rifleman	..	..	..	1,984	4	6	Parkes.
	1863	..	..	..	2,268	5	0	,,
Great Britain (Present)	Coat with detachable cape	..	..	..	2,749	6	1	F.S. Manual, 1888.
	Dark grey ..	2,721	6	0	2,961	6	8½	,, ,, 1897. 1899.
	Mark iv, drab..	2,721	6	0	2,500	5	8¼	A.O. 71, April, 1904.
	,, v, ,, ..	2,494	5	8	2,806	6	3	F.S. Manual 1907. 1908.
	,, vi, ,, ..	3,061	6	12	2,948	6	8	,, ,, 1910.
Germany ..	"Mantel" Europe, grey	1,984	4	8	1,900	..	..	Lavisse, 1902.
					1,700	..	..	Von Feldmann, 1910.
	"Mantel" Asia, grey	1,814	4	0	..	..	..	—
France[1] ..	Capote, blue ..	2,268	5	0	2,160	..	..	Lemoine, 1911.
					2,200	..	..	Lavisse, 1902.
					2,161	..	..	Veltzé, 1906.
	Manteau-pélerine (Alpine troops)	..	..	..	2,485	5	7½	Barthélemy and Eychêne, 1904.
Austria ..	1905, dark blue	2,721	6	0	2,700	..	..	Lavisse, 1902.
					2,868	..	..	Veltzé, 1906.
					2,670	..	..	Krauss, 1907.
Italy[1] ..	Old pattern, dark blue	1,927	4	4	1,570	..	..	Lavisse, 1902.
					2,135	..	..	Veltzé, 1906.
Sweden ..	Grey, 1906 ..	3,061	6	12	2,800	..	..	Lavisse, 1902.
U.S.A.[1] ..	Olive drab with hood, 1911	3,741	8	4	3,550	..	..	Lavisse, 1902.
Russia ..	Dark grey (old)	2,948	6	8	2,450	..	..	Lavisse, 1902.
					3,400	..	..	Smerdoff, 1909.
	Brown (new) ..	3,288	7	4	3,583	..	..	W.O. Report, 1907.
					3,301	..	..	Veltzé, 1906.
Japan ..	Blanket coat with hood, 1905	3,288	7	4	..	..	..	—
	Ordinary, drab	..	..	..	2,300	5	1½	Mantignon, 1907.

[1] The French and Italian great-coats are always carried on the person, though the latter Power is gradually abolishing this system. The American great-coat is not meant to be carried as part of the soldier's kit.

From that date onwards our soldiers have been provided with a great-coat at the public expense, and the life of such a coat is at present laid down as five years.

Dr. Robert Jackson's [8] views on great-coats are interesting. He says: "Besides the fashion of the coat (tunic) here recommended, a cloak or mantle, as better calculated to protect the body against impressions from cold when exercise is suspended and rest commences, is an essential part of a soldier's equipment. It has advantages over the blanket and great-coat (watch-coat), inasmuch as it answers the purpose of both. A soldier in the present times (1804) carries a blanket for the sake of warmth which it affords at night; a great-coat is provided for the protection of himself and his arms from rain when on duty. A great-coat is not held to be sufficient protection against cold at night; a blanket is therefore provided for night covering, and hence two things are provided for a purpose which might be answered by one. A cloak made in the form of the Portugal cloak, the cloth close and duffle and coarse woollen cloth, so as to be both light and warm, and manufactured by incorporating grease or oil with the raw material so as to be little penetrable to wet, sufficiently long to cover the feet when the knees are bent, and provided with buttons and loops that it may be tucked up in marching, is to be considered as sufficient defence against the cold of the night in the common circumstances of service. It defends the body from rain when on duty, and it does not encumber with unnecessary weight in travelling. Such are the properties of the military cloak, and viewed in this light it is evidently a most useful provision to a soldier's equipment."

In another place he complains of the quality of the clothing then supplied. "With a great-coat and boots of the manufacture of 1760, a person might travel for half a day in heavy rain without being wet to the skin. With a coat of the manufacture of the present day he is drenched to the skin by a summer shower, and his feet are wet by the dew which hangs on the grass of a summer's morning."

For many years the dark blue cloth cloaks and great-coats of the mounted services gave every satisfaction.

This cloth (4B) weighed, unwaterproofed, 30½ to 31½ oz. per yard of 56 in., and cost 6s. a yard. It was a very heavily milled fabric, and even unwaterproofed had very substantial rain-resisting properties.

During the same period the infantry had the "great-coat cloth grey," which was made from waterproofed material weighing 31 to

32 oz. per yard of 56 in. wide. This coat gave satisfaction as regards wear, but its waterproof qualities were, however, not so satisfactory as in the case of the blue coat.

In 1900-1 General Vetch's Committee on Clothing [9], which recommended the adoption of the present field service uniform and aimed at the reduction in the weight of the great-coat, recommended the adoption of a lighter cloth of the general service drab colour.

This cloth, unshrunk and unwaterproofed, only weighed 26 to 27 oz. per yard 56 in. wide; the price of the material was 5s. 4d. a yard, and was softer than the grey cloth of the old infantry coat.

The pattern approved was on the lines of the original "aquascutum" coat, loosely made, with great room in the sleeves (leg-of-mutton-shaped) and a slit in the side to allow the hands to gain access to the inner garments, a small cape over the shoulders, and folding 6 in. cuffs.

This coat in later patterns (Mark iv) was shorn of the cape and cuffs and the large sleeves were also discarded.

On account of adverse reports as to the rain-resisting properties and the want of warmth of this material, a return was made to a heavier weight of cloth in the manufacture of great-coats in 1905, cuffs again being added to the sleeves. The cloth which is now being used in the manufacture of the present pattern (Mark vi) of great-coat, shrunk and waterproofed, weighs 33 to 33½ oz. per yard of 56 in. Although by the adoption of the lighter cloth about one pound was saved in weight, its efficiency as a warm garment, the primary object of a great-coat, was impaired, while further, these coats were very absorbent of moisture and at once became sodden in rain.

The present coat, Mark vi, is a warm and showerproof garment, but is heavy. The official weight is 6 lb. 8 oz., but some of the coats weigh even more, a size 6, which is the commonest size obtained from Pimlico, weighing 6 lb. 12 oz. The coats are unlined except for the sleeves.

The coats are manufactured in twelve sizes, the difference in weight between each being 3 or 4 oz. The blue great-coat of the Guards weighs 7 lb., but it is not taken on service.

As the Expeditionary Force is not equipped with blankets, unless especially ordered, the soldier goes on service carrying his great-coat, and with a waterproof sheet in the second line transport as his only means of protection against the elements.

The question arises, could he not be better protected for the

6 lb. 8 oz., the weight of the great-coat he carries, by cutting off the skirts of the great-coat, which means the saving of 1½ lb., and utilizing this weight for overalls?

The present overcoat is not a practical garment for sleeping in, as during sleep the skirts are very easily displaced. There is always one part of the body uncovered, and even the part covered is not sheltered from the wind, which will penetrate from all directions. It is an impossible garment in which to march. The legs of a man on the march do not feel cold and it is unnecessary to cover them.

With the different equipments the great-coat has been carried in varying positions. With the old square knapsack it was carried in a roll on the top. As the coat had to be rolled up very neatly, a process which required three men, some regiments carried it horseshoe fashion round the knapsack, which was a better plan. Later the coat was carried on the back of the pack, which was an objectionable position, since the weight was thus placed further from the centre of gravity. In the valise equipment, introduced after the Eyre Committee in 1865, the great-coat was carried high up on the back above the valise. In the valise equipment (1888) it was carried rolled tightly attached to the belt. The men of the Royal Army Medical Corps still use the belt and coat straps of this equipment. This method of carrying the great-coat could hardly be worse as it makes it necessary for the belt to be worn tight, and even then the whole bundle tends to sag and bump on the buttocks. The men at the depot are now carrying the coat *en banderole* which is a better though by no means an ideal way.

In the Bandolier equipment (1903) the great-coat was again carried in web straps high up on the back. With the present web equipment (1908) it is carried inside the pack.

On many occasions great-coats have been carried on transport or actually left behind, and this would relieve the soldier of a very considerable weight. In the Peninsula, when tents were carried for the troops, the Duke of Wellington [10] ordered that the great-coats should be left behind, and in the South African War the Natal Field Force [11] almost always had their coats carried for them in the regimental transport, and an instance of how separation from this article caused distress occurred to the infantry bivouacking on the top of Botha's Pass after its capture on June 8, 1900, when they suffered greatly from cold. The troops with the Tibet Mission (1903-04) carried either a great-coat, poshteen, or coat, British-warm.

Fig. 1.—French Infantry Great-coat.

France.—The French wear their great-coat on all occasions and are the only people who are consistent in this practice. This practice was in vogue during the Crimean War [12].

Many French writers have argued that it causes unnecessary fatigue. The experiences of an Englishman in Morocco do not bear this out. He writes: "One would have thought that the long great-coat would be the most uncomfortable article of clothing, very ill-suited for campaigning in a hot climate; but the Legionary swears by it, and says it is cool in summer and warm in winter, an easy thing to march in, with its flaps buttoned back, and a warm thing to sleep in, with its flaps let down" [13].

It has been argued that it is better to carry the great-coat actually on the person than rolled on the knapsack, but in the event of rain the coat will take up more water on account of its large surface. Most Continental armies carry the great-coat rolled up in the tent piece, and as a rule do not put on the coat for rain during a march.

The present great-coat is double-breasted and made of blue-grey cloth. It has a stand-up collar fastening by a hook and eye. It used to have detachable red epaulettes, but these have lately been discarded. On the left-hand side of the coat there is a leather-lined loop of cloth which buttons over the belt and maintains it in position. The front corners of the skirts have button-holes and they can be buttoned back to a button at the bottom of the skirt pocket opening. This is the normal way of wearing the coat. The sleeves have no cuffs, but can be buttoned back if desired. There is the usual tightening cloth belt behind. This is the only coat with a stand-up collar, and when the men wearing the kepi are marching in rain there is nothing to prevent water running down their necks. Regulations lay down that the coat should be 330 mm. (13 in.) from the ground.

It is not a heavy garment, weighing 2,160 grm. ($4\frac{3}{4}$ lb.), and experiments have lately been made with an even lighter coat, weighing only 1,500 grm. (3·6 lb.). This is made of lighter material with a falling collar, cape and bronzed buttons. In place of the epaulettes there are cloth shoulder straps with a small roll of cloth at the outer end. The Austrians have a similar contrivance on the right shoulder only. The great-coat is not waterproofed, and Lemoine states it will take up as much as 2 kilos (4·4 lb.) of water.

Trials have been made with waterproofed coats, but the results were bad. The men complained that the coats were stiff, that

FIG. 2.—German Infantry great-coat.

they wore badly, and that the weight was increased, though such a coat treated by the aluminium acetate process showed only an increase of 16 grm. (0·6 oz.)

Fig. 3.—German Infantry great-coat (cotton hood in position).

Alpine troops (*Chasseurs alpins*) carry their great-coat (*Manteau-pélerine* or *Manteau à capuchon*) rolled horse-shoe shaped round their knapsack. This coat has a detachable hood.

The *Zouaves* and *Tirailleurs* of the African troops carry a blue-grey cape with hood (*Le collet à capuchon*) on their knapsacks.

The men of the Foreign Legion (*Regiments étrangers*) and the *bataillons d'Afrique* have the ordinary great-coat (*capote*), which may be worn or carried as circumstances require.

Germany.—In 1714 the great-coat was abolished in the Prussian army by Frederick William I. and was only re-introduced in 1807 during the reign of Frederick William II., when it took the place of woollen blankets carried on special wagons.

The early great-coat reached below the calf and had a standing collar. By 1871 it had been shortened and provided with a falling collar and hood [14].

The present German great-coat is made from grey cloth 2 mm. thick, with a porosity (*Porenvolume*) of 63 per cent. It is not waterproofed in any way. The pattern now in use has been considerably lightened. The lining and hood have been abolished and a compromise between double and single breast has been arrived at [15].

There is a falling collar which covers a cotton hood; this hood, in spite of its lightness, affords protection to the head and ears without impeding the hearing and can be worn with the helmet in position; further, it prevents water from running down the neck. There are hooks on the front corners of the skirt which can be utilized as in the French coat. The sleeves have large cuffs which can be turned down to cover the hands. There are two leather-lined openings on each side at the waist level through which the belt passes.

Experiments have shown that this coat dipped in water absorbed six litres, and after wringing still contained four [16].

Austria.—Until 1866 the Austrians used to march in their great-coats; since then they have carried them on their knapsacks [17].

The present great-coat is made of dark blue cloth, double-breasted, with a falling collar and cuffs. There are hooks at the corners of the skirt in front which engage in eyes sewn to the underside of the garment. It is carried wrapped in the tent piece round the knapsack.

Russia.—"An essential part of the Russian soldier's dress is the great-cloak, which in the Battle of Alma so much surprised the English. Made of rough but strong, long-napped, mouse-grey cloth, reaching beyond the knees, it resembles a *sac-paletot*, or great overcoat. Large enough to fit over a soldier's full equipment,

it allows of being contracted about the waist from the inside by means of string or tape. In time of war, this *paletot* serves a great many purposes : as a cloak, a morning coat, a bed cover, and rain protector. In cold weather, it is worn on the march; after rain, when the ordinary uniform is wet through, the *paletot* alone is worn till the clothes get dry" [18].

Such was the great-coat of the Russians during the Crimean War, and a somewhat similar, though not so voluminous, coat is still in use.

It is a double-breasted coat made of light brown coarse cloth, fastening across the chest by hooks and eyes. There is a turn-down collar and cuffs to the sleeves. It can be gathered in behind by the use of a strap and buttons. (In addition to this, each man has a hood or "bashilk" made of camels'-hair cloth with long ends which can be rolled round the neck. When the great-coat is worn the hood hangs on the man's back and the loose ends are crossed on the chest and tucked under the waist-belt.) The coat is carried *en banderole*, the shelter tent piece and accessories being wrapped in it.

Italy.—Until very recently the Italian soldier always wore his great-coat. The coat was worn over the shirt for all kinds of work. It was made of dark blue cloth, single-breasted, with one row of white metal buttons. There was a small turn-down collar, but no cuffs. Instead of shoulder straps on the point of the shoulder there were small epaulettes in the shape of a roll of cloth. The tails of this coat were turned back from the front and joined by buttoning them together behind the back.

The Alpine regiments clothed with the new grey-green uniform have no great-coat and carry instead a short, wide, green cape.

Sweden.—The Swedes carry a large double-breasted overcoat of grey cloth in a horseshoe-shaped roll round the knapsack. The tent piece forms the outer covering of this roll. The coat is lined for three quarters of its length with the same material. Hooks are sewn on the front corners of the skirt, to allow of them being turned back.

United States.—The new olive-drab great-coat is not carried on the person and is not meant for use on service. It is a double-breasted coat made of cloth, lined throughout with brown twill. There is a detachable hood fastened to five buttons round the base of the collar. The large stand and fall collar fastens across the throat by one large hook and eye. The coat has no shoulder straps, but there is the usual strap behind.

Japan.—The ordinary service coat is a double-breasted garment made of drab-coloured woollen cloth with a non-detachable hood. The free edges of the front of the skirt instead of being cut straight

FIG. 4.—Japanese blanket coat.

slope outwards below the waist, making the skirts of the coat lap over more completely below, thus preventing them from gaping, and protecting the legs and knees from rain when marching. The

skirts can be buttoned back as in the French coat. The front is fastened up by five buttons placed diagonally. Hooks are provided at the waist level to support the belt when the equipment is worn.

In *Manchuria* a special unlined khaki-coloured blanket-coat was issued to the troops. This was an excellent garment made of coarse cloth and not meant to last more than about six months. The coat was very roomy with a large vent behind allowing the accoutrements to be worn underneath it. There was a large falling collar lined with sheep's skin in which a cotton hood similar to the German hood collapsed.

All fastenings except that of the large tongue buttoning across the throat were made by hooks and eyes. A detachable waist-belt of the same material enabled the coat to be drawn in at the waist. On each side just below the shoulders there was a cloth loop through which passed the tape to which the mitts were attached. This was an ingenious way of preventing the loss of these articles.

Switzerland.—For some time experiments have been in progress with a poncho (*la tente manteau du Dr. Koller*), which would replace the great-coat. It consists of a rectangular waterproof piece 2 metres (6½ ft.) long and 1.3 metres (4¼ ft.) wide. There is a hole or slit in the centre for the head and it is worn over all the accoutrements. So far it has only been adopted officially for the cavalry.

REFERENCES.

[1] HILLER. "Die Gesundheitspflege des Heeres," 1905, p. 92.
[2] LEMOINE. "Traité d'Hygiène militaire."
[3] SCOTT. "The British Army," vol. ii, p. 455.
[4] GUNNING, GEORGE. "Dragoon Guards to Lord Melbourne," Pamphlets R.U.S.I., 1838.
[5] WALTON. "History of the British Standing Army, 1660-1770," 1894, p. 377.
[6] FORTESCUE. "History of the British Army," vol. iv, part ii, p. 902.
[7] CLODE. "Military Forces of the Crown," 1869.
[8] JACKSON, DR. ROBERT. "On the Formation, Discipline, and Economy of Armies," Third Edition, 1845, p. 354.
[9] "Report of the Committee (General Vetch) on the Clothing for British Soldiers, Peace and War, 1900-01."
[10] WELLINGTON. "Supplementary Despatches, Correspondence, and Memoranda," vol. vii, p. 562, 1860.
[11] "The *Times* History of the War in South Africa, 1900," 1906, vol. iv, p. 188.
[12] "Report of the Committee on the Army before Sebastopol, 1855." Q. 4434.
[13] RANKIN. "In Morocco with General d'Amade," p. 30.
[14] KIRCHNER. "Lehrbuch der militär-Hygiene," 1869.
[15] BISCHOFF. "Lehrbuch der Militärhygiene," vol. i, 1910, p. 160.
[16] MÜLLER, B. "Archiv für Hygiene," vol. ii.
[17] COUSIN. "L'Équipement et la Charge de l'Infanterie," Paris.
[18] "A.M.D. Report," 1876, Appendix No. xvii.

THE TRYPANOSOMES FOUND IN THE BLOOD OF WILD ANIMALS LIVING IN THE SLEEPING-SICKNESS AREA, NYASALAND.[1]

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Introduction.

The chief object of this Commission in coming to Nyasaland was to inquire into the relation of the African fauna to the maintenance and spread of trypanosome disease.

The Commission arrived at their camp on Kasu Hill on January 12, 1912. As this was the rainy season the low country was covered with dense vegetation and much of it under water. Nothing could therefore be done in the study of the fauna until about the beginning of June, when the dry season was well established.

The camp at Kasu is situated on one of the hills (lat. 13° 40′ S., long. 34° 12′ E.) which rise on the western edge of the flat country adjoining Lake Nyasa. This low-lying, lake coast plain looks quite flat when viewed from the camp, and extends from the lake shore some twenty miles inland. The camp lies about ten miles from the edge of this low country, and, therefore, some thirty miles from the lake. This plain is covered with thorn scrub, except near the lake, where there are large grassy plains, or "dambos," dotted over with palm trees. The thorn scrub is the home of the tsetse-fly and also of numerous wild animals.

When an animal is shot in this fly country by a member of the Commission a small quantity of the blood is taken in a bottle containing citrate of soda solution for inoculation purposes, and a thick and thin film of the blood spread on glass slides for microscopical examination. The blood is then sent to a point on one of the main paths, where a motor-cyclist is waiting to carry it to the camp. When the blood arrives it is at once injected into a goat, a monkey and a dog.

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[1] Reprinted from the *Proceedings of the Royal Society*, B, vol. lxxxvi.

[2] Dr. Davey resigned his membership of the Commission in October, before the completion of the work here recorded.

Wild Animals living in a Fly-area as Hosts or Reservoirs of Trypanosome Disease.

The following table represents the result of the examination of 180 specimens of wild game or other animals shot in this fly-area. In one column is given the number of hours between the taking of the blood and its inoculation, in others the result of the microscopical examination of the thick and thin film, and of the inoculation of the blood. A plus sign means that trypanosomes are present, a minus sign that they are absent, and a blank space (..) that a microscopical specimen was not available for examination, or an animal for inoculation, as the case may be.

TABLE I.—List of Wild Animals living in a Fly-area whose Blood has been examined for Trypanosomes.

Date	Expt. No.	Animal	Age of blood in hours	By microscopical examination		By inoculation		
				Thick	Thin	Goat	Monkey	Dog
1912								
Jan. 20	32	Hartebeeste	..	–	–	–	..	–
,, 20	33	,,	..	..	–	–	..	–
,, 20	34	,,	..	..	–	–	..	–
,, 22	40	,,	..	..	–	–	..	–
,, 22	41	Eland ..	..	..	–	–	..	+
,, 22	44	,, ..	..	..	–	+	..	–
,, 23	62	Sable ..	..	–	–	–	..	–
,, 23	63	,, ..	..	..	..	–	..	–
,, 26	95	Eland ..	..	–	–	–	..	–
Feb. 6	159	Warthog ..	..	..	..	–	..	–
,, 6	160	Sable ..	..	..	–	–	..	–
,, 18	246	Elephant ..	..	..	–	–	..	–
,, 23	283	Eland ..	..	..	–	..	..	..
,, 28	288	Lion ..	..	..	–	–	..	–
May 19	615	Oribi ..	3	–	–	–	..	–
,, 19	616	Waterbuck ..	17	..	+	–	..	..
,, 25	583	Duiker ..	..	..	–	–	–	–
,, 25	584	Warthog ..	..	..	–	–	–	–
,, 26	589	,, ..	..	..	–	..	..	–
,, 26	591	Reedbuck ..	..	..	+	..	..	–
,, 26	593	Duiker ..	..	..	–	..	..	–
June 2	611	Buffalo ..	9	–	–	–	–	–
,, 2	612	,, ..	9	–	–	–	–	–
,, 2	613	,, ..	9	+	–	–	–	–
,, 2	614	,, ..	9	–	–	–	–	–
,, 15	686	Warthog ..	9½	–	–	–	–	–
,, 15	687	Oribi ..	9½	–	–	–	–	–
,, 16	692	Reedbuck ..	8½	–	–	–	–	–
,, 16	695	Sable ..	5	–	–	–	–	–
,, 23	742	Warthog ..	9	–	–	–	–	–
,, 23	742*a*	,, ..	9	–	–	–	–	–
,, 23	743	Oribi ..	9	+	–	–	–	–
,, 23	743*a*	,, ..	9	–	–	–	–	–
,, 25	744	Duiker ..	7½	–	–	–	–	–

TABLE I.—*Continued.*

Date	Expt. No.	Animal	Age of blood in hours	By microscopical examination		By inoculation		
				Thick	Thin	Goat	Monkey	Dog
June 27	755	Bushbuck ..	11	–	–	–	–	–
,, 29	768	Hartebeeste	6½	–	–	–	–	–
,, 29	769	Reedbuck ..	5½	–	–	..	–	–
,, 29	780	,, ..	2	–	–	..	–	–
,, 30	783	,, ..	¼	+	+	..	+	+
July 1	777	Hartebeeste	7	..	..	–	–	–
,, 1	778	,,	7	..	..	–	–	–
,, 1	779	,,	7	..	..	+	+	+
,, 2	820	Oribi ..	7½	..	–	..	..	–
,, 3	801	,, ..	7½	–	–	–	–	–
,, 3	818	Warthog ..	11¾	–	–	..	–	..
,, 4	813	Hartebeeste	8	–	–	–	–	–
,, 4	814	,,	8	–	–	–	–	–
,, 4	815	,,	8	–	–	–	–	–
,, 4	816	,,	8	–	–	–	–	–
,, 4	817	,,	8	–	–	–	–	–
,, 5	828	Reedbuck ..	..	+	–	..	–	–
,, 6	825	Hartebeeste	8	–	–	..	..	..
,, 6	826	Warthog ..	7¾	+	+	–	–	–
,, 6	827	Oribi ..	7¼	–	–	–	–	–
,, 8	844	Hartebeeste	4¾	–	–	–	–	–
,, 8	863	Oribi ..	1¼	–	–	..	+	–
,, 10	859	Hartebeeste	9¾	–	–	–	–	–
,, 10	860	Oribi ..	5¾	–	+	–	–	–
,, 10	861	Warthog ..	6¾	–	–	–	–	–
,, 10	862	Oribi ..	5¾	–	–	–	–	–
,, 11	866	,, ..	7½	–	–	–	–	–
,, 11	869	Warthog ..	8½	–	–	–	–	–
,, 11	872	,, ..	7½	–	–	–	–	–
,, 11	875	Hartebeeste	5¾	–	–	–	–	–
,, 20	912	Reedbuck ..	7¼	–	–	+	–	–
,, 21	918	Hartebeeste	8	–	–	–	–	–
,, 21	919	Oribi ..	7	–	–	–	–	–
,, 21	920	Warthog ..	5	–	–	–	..	–
,, 21	920*a*	,, ..	5	–	–	–	–	–
,, 21	920*b*	,, ..	5	–	–	–	–	–
,, 21	921	Oribi ..	8	–	–	–	–	–
,, 21	923	Warthog ..	10	–	–	–	–	–
,, 21	925	Bushbuck ..	10	–	–	–	–	–
,, 22	927	Hartebeeste	7¾	–	–	–	–	–
,, 22	929	Warthog ..	5¾	–	–	–	–	–
,, 22	931	,, ..	5¾	–	–	–	–	–
,, 22	933	Warthog ..	4½	+	+	–	–	–
,, 22	935	,, ..	4½	–	–	–	–	–
,, 23	955	Hyæna ..	8	–	–	+	–	–
,, 23	956	,, ..	8	+	–	–	–	–
,, 23	957	Hartebeeste	5	–	–	+	+	+
,, 23	958	,,	3⅓	+	+	–	–	–
,, 25	988	Reedbuck ..	6¾	+	+	+	–	–
,, 26	993	Duiker ..	5½	–	–	–	–	–
,, 27	1000	Hartebeeste	3½	+	–	+	+	+
,, 29	1004	,,	5¼	–	–	–	–	–
,, 29	1007	Duiker ..	4	+	–	–	–	–
,, 30	1010	Hartebeeste	4	–	–	–	–	–

TABLE I.—*Continued.*

Date	Expt. No.	Animal	Age of blood in hours	By microscopical examination		By inoculation		
				Thick	Thin	Goat	Monkey	Dog
July 30	1013	Eland ..	4	+	+	+	+	+
Aug. 1	1017	Oribi ..	8¼	−	−	−	−	−
,, 2	1024	Sable ..	7¼	−	−	−	−	−
,, 2	1027	Duiker ..	5¼	+	−	−	−	−
,, 4	1044	Eland ..	6½	−	−	+	−	−
,, 5	1045	Duiker ..	6¾	−	−	−	−	−
,, 5	1048	Wild cat ..	3	−	−	−	−	−
,, 7	1052	Warthog ..	5¾	−	−	−	−	−
,, 7	1055	Wild cat ..	2¾	−	−	−	−	−
,, 11	1058	Koodoo ..	3½	+	+	−	−	−
,, 11	1061	Waterbuck ..	2¾	+	−	+	−	−
,, 11	1064	Warthog ..	2¾	+	+	−	−	−
,, 12	1067	Hyæna ..	4	−	−	−	−	−
,, 18	1075	Waterbuck ..	5	−	−	−	−	−
,, 18	1078	Bushbuck ..	3	+	+	+	−	−
,, 18	1081	,, ..	3	+	−	−	−	−
,, 18	1084	,, ..	3	+	+	+	+	+
,, 18	1087	,, ..	3	+	+	+	−	−
,, 19	1090	Oribi ..	7	−	−	−	−	−
,, 19	1093	,, ..	7	−	−	−	−	−
,, 19	1096	,, ..	7	−	−	+	−	−
,, 19	1099	,, ..	7	−	−	−	−	−
,, 19	1102	,, ..	7	−	−	−	−	−
,, 21	1136	Warthog ..	5¾	−	−	−	−	−
,, 21	1139	,, ..	5	+	+	+	−	−
,, 21	1142	Hartebeeste	7½	−	−	+	−	+
,, 21	1145	,,	6¾	−	−	−	−	−
,, 22	1150	Reedbuck ..	8½	+	+	+	−	−
,, 22	1153	,, ..	8½	+	−	+	−	−
,, 22	1156	,, ..	7	+	−	+	−	−
,, 22	1159	,, ..	7	−	−	−	−	−
,, 22	1162	,, ..	6	+	−	+	−	−
,, 22	1165	,, ..	6	−	−	−	−	−
,, 23	1168	Warthog ..	7¾	−	−	−	−	−
,, 23	1171	Wild cat ..	6¾	−	−	−	−	−
,, 23	1174	Waterbuck ..	7	−	−	−	−	−
,, 24	1177	,, ..	5	−	−	−	−	−
,, 24	1180	,, ..	5	+	−	+	+	+
,, 24	1183	Warthog ..	7½	−	−	−	−	−
,, 24	1186	,, ..	6	+	−	+	−	−
,, 24	1189	,, ..	6	+	−	−	−	−
,, 24	1192	Oribi.. ..	7¼	−	−	−	−	−
,, 24	1195	,, ...	7¼	−	−	−	−	−
,, 24	1198	Porcupine ..	8½	−	−	−	−	−
,, 28	1202	Eland ..	4	+	+	+	..	+
,, 28	1203	Bushbuck ..	5	+	+	−	−	−
,, 28	1205	Eland ..	4	−	−	−	..	−
,, 28	1210	Waterbuck ..	4	+	−	+	+	+
,, 30	1216	Bushbuck ..	8	+	−	−	..	−
Sept. 6	1250	Koodoo ..	2	−	−	−	−	−
,, 6	1254	Oribi ..	6¾	−	−	−	−	−
,, 7	1261	Bushbuck ..	4¼	−	−	+	−	−
,, 7	1264	Waterbuck ..	3¼	+	+	−	+	+
,, 7	1268	Buffalo ..	6¼	−	−	−	−	−

TABLE I.—*Continued.*

Date	Expt. No.	Animal	Age of blood in hours	By microscopical examination		By inoculation		
				Thick	Thin	Goat	Monkey	Dog
Sept. 7	1272	Hartebeeste	5¼	–	–	–	–	–
,, 7	1276	Warthog ..	4	–	–	–	–	–
,, 7	1281	Buffalo ..	9	–	–	–	–	–
,, 10	1285	,, ..	5	–	–	–	–	–
,, 10	1289	Eland ..	8¼	–	–	–	–	–
,, 10	1293	Warthog ..	12¾	–	–	–	–	–
,, 10	1298	Buffalo ..	5	–	–	–	–	–
,, 11	1304	,, ..	3¼	–	–	+	–	–
,, 12	1308	Warthog ..	6	..	..	+	–	–
,, 13	1339	Waterbuck ..	6½	–	–	+	–	–
,, 13	1343	Bushbuck ..	7	–	–	–	–	–
,, 13	1347	Reedbuck ..	6	+	–	–	+	+
,, 13	1351	,, ..	5¾	–	–	–	–	–
,, 14	1355	Hartebeeste	7½	–	–	–	–	–
,, 14	1359	,,	7½	–	–	–	–	–
,, 14	1363	Reedbuck ..	6	–	–	+	–	–
,, 16	1368	Oribi ..	7¼	–	–	–	–	–
,, 16	1372	,, ..	7¼	–	–	–	–	–
,, 16	1376	Elephant ..	20	–	–	–	–	–
,, 17	1380	Koodoo ..	2½	–	–	+	–	–
,, 17	1384	Warthog ..	6½	–	–	–	–	–
,, 18	1388	Waterbuck ..	8	+	+	+	–	–
,, 18	1392	Hartebeeste	5	–	–	–	–	–
,, 18	1396	,,	5	–	–	–	–	–
,, 18	1400	Oribi ..	4½	–	–	–	–	–
,, 20	1406	Waterbuck ..	9	–	–	+	–	–
,, 20	1410	,, ..	9	–	+	–	–	–
,, 20	1414	Warthog ..	6¼	–	–	–	–	–
,, 20	1418	Hartebeeste	..	–	–	–	–	–
,, 20	1422	,,	9	–	–	–	–	–
,, 20	1426	,,	7	–	–	–	–	–
,, 20	1435	Reedbuck ..	9	–	–	–	+	+
,, 20	1439	,, ..	8½	–	–	–	–	–
,, 20	1443	Oribi ..	7¾	–	–	–	–	–
,, 24	1447	Waterbuck ..	14	–	–	–	–	–
,, 25	1453	Hartebeeste	10½	+	–	–	–	+
Oct. 6	1471	Eland ..	2	+	–	+	–	–
Nov. 10	1577	Warthog ..	3½	–	–	–	–	–

Total 180. Infected with pathogenic trypanosomes 57 = 31·7 per cent.

In the above table an account is given of the examination of 180 wild animals shot in the fly-area adjoining the Commission's camp at Kasu. This part of the country is situated in the proclaimed Sleeping-Sickness Area of Nyasaland, which extends from the Chirua River (lat. 13° 20′ S., long. 34° E.) in the north to the Lintipe River (lat. 13° 50′ S., long. 34° 30′ E.) in the south. It is bounded on the east by the Lake and on the west by the foothills. The area is about fifty miles from north to south and twenty-five from east to west. These figures are only approximate, as the

available maps are far from correct. This is the only part of this country in which cases of the human trypanosome disease of Nyasaland, up to the present, have been found. It will be seen, then, that these animals were procured from the very heart of the Sleeping-Sickness Area.

Among the 180 animals, 57 were found to harbour pathogenic trypanosomes—31·7 per cent.

Table II gives the species of trypanosomes found in the 180 animals. Here a difficulty is encountered—the classification. The tendency in this branch of natural history, as in all others, is to multiply species.

In a previous paper[1] the trypanosome causing human trypanosome disease in Nyasaland was called *Trypanosoma rhodesiense*, on account of the presence of posterior-nuclear forms. This trypanosome agreed in all other respects with *T. brucei*, the common trypanosome of wild animals in South Africa, and the cause of the tsetse-fly disease, or nagana. In order to compare the two species of trypanosomes more closely, the Commission procured, by the kindness of Dr. A. Theiler, C.M.G., Pretoria, a strain of nagana from the same spot in Zululand where it was first discovered in 1894. Much to the surprise of the Commission it was found that *T. brucei* has quite as large a proportion of posterior-nuclear forms as *T. rhodesiense*, and that the blunt-ended character is common to both species. The Commission is therefore driven to the conclusion that *T. rhodesiense* is neither more nor less than *T. brucei*, and that the human trypanosome disease of Nyasaland is nagana.

To this it may be objected that nagana has never been known to attack human beings. This has probably been due to faulty diagnosis, cases in man being returned as malaria.

The pathogenic trypanosomes then, found in the blood of wild animals in Nyasaland, up to the present, by the Commission are *T. brucei* (Plimmer and Bradford) vel *rhodesiense* (Stephens and Fantham), *T. pecorum*, *T. simiæ*, and *T. capræ* (Kleine). *T. ingens* is also found, but this trypanosome cannot, with our present knowledge, be considered a pathogenic species to man or domestic animals.

In Table II the plus sign means that the trypanosome named at the top of the column was present in the blood. The other plus signs signify that the trypanosome was found in a thick or thin

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[1] *Proc. Roy. Soc.*, 1912, B, vol. lxxxv, p. 423.

TABLE II.—SPECIES OF TRYPANOSOMES FOUND IN THE BLOOD OF WILD ANIMALS LIVING IN THE SLEEPING-SICKNESS AREA, NYASALAND.

Date	Expt. No.	Animal	*T. brucei* vel *rhodesiense*	*T. pecorum*	*T. simiæ*	*T. capræ*	*T. ingens*	Thick film	Thin film	Inoculation
1912										
Jan. 22	41	Eland	..	+	..	..	..	..	..	+
,, 22	41	,,	..	+	..	..	..	..	..	+
May 19	616	Waterbuck	..	..	..	+	..	..	+	..
,, 26	591	Reedbuck	..	..	..	+	..	..	+	..
June 2	613	Buffalo	..	+	..	..	..	+	..	..
,, 23	743	Oribi	..	..	..	..	+	+	..	..
,, 30	783	Reedbuck	+	..	..	+	..	+	+	+
July 1	779	Hartebeeste	+	..	..	..	..	..	..	+
,, 5	828	Reedbuck	..	..	..	+	+	+	..	..
,, 6	826	Warthog	..	+	..	..	..	+	+	..
,, 8	863	Oribi	+	..	..	..	..	..	..	+
,, 10	860	,,	..	..	..	+	..	..	+	..
,, 20	912	Reedbuck	..	+	..	..	..	..	..	+
,, 22	933	Warthog	..	+	..	..	..	+	+	..
,, 23	955	Hyæna	..	+	..	..	..	..	..	+
,, 23	956	,,	..	+	..	..	..	+	..	..
,, 23	957	Hartebeeste	+	..	..	..	..	..	..	+
,, 23	958	,,	+	..	..	..	..	+	+	..
,, 25	988	Reedbuck	..	..	..	+	..	+	+	+
,, 27	1,000	Hartebeeste	+	..	..	..	..	+	..	+
,, 29	1,007	Duiker	+	..	..	..	..	+	..	..
,, 30	1,013	Eland	..	+	..	+	..	+	+	+
Aug. 2	1,027	Duiker	..	..	..	..	+	+	..	..
,, 4	1,044	Eland	..	+	..	..	..	..	..	+
,, 11	1,058	Koodoo	..	+	..	..	..	+	+	..
,, 11	1,061	Waterbuck	..	+	..	+	..	+	..	+
,, 11	1,064	Warthog	+	..	..	..	..	+	..	..
,, 18	1,078	Bushbuck	..	+	..	..	..	+	+	+
,, 18	1,081	,,	..	+	..	..	..	+	..	..
,, 18	1,084	,,	..	+	..	..	..	+	+	+
,, 18	1,087	,,	..	+	..	+	..	+	+	+
,, 19	1,096	Oribi	..	+	..	..	..	..	..	+
,, 21	1,139	Warthog	..	..	+	..	..	+	+	+
,, 21	1,142	Hartebeeste	+	..	..	..	..	..	..	+
,, 22	1,150	Reedbuck	..	..	..	+	..	+	+	+
,, 22	1,153	,,	..	..	..	+	..	+	..	+
,, 22	1,156	,,	..	..	..	+	..	+	..	+
,, 22	1,162	,,	..	..	..	+	..	+	..	+
,, 24	1,180	Waterbuck	+	..	..	+	..	+	..	+
,, 24	1,186	Warthog	..	..	+	..	..	+	..	+
,, 24	1,189	,,	..	+	..	..	..	+	..	..
,, 28	1,202	Eland	..	+	..	..	..	+	+	+
,, 28	1,203	Bushbuck	..	+	..	..	..	+	+	..
,, 28	1,210	Waterbuck	+	..	..	+	..	+	..	+
,, 30	1,216	Bushbuck	..	+	..	..	..	+	..	..
Sept. 7	1,261	,,	..	+	..	..	..	..	..	+
,, 7	1,264	Waterbuck	+	..	..	..	..	+	+	+
,, 11	1,304	Buffalo	..	+	..	..	..	..	..	+
,, 12	1,308	Warthog	..	..	+	..	..	..	..	+
,, 13	1,339	Waterbuck	..	..	..	+	..	..	..	+
,, 13	1,347	Reedbuck	+	..	..	..	..	+	..	+
,, 14	1,363	,,	..	..	..	+	..	..	..	+
,, 17	1,380	Koodoo	..	+	..	..	..	..	..	+
,, 18	1,388	Waterbuck	..	..	..	+	..	+	+	+
,, 20	1,406	,,	..	..	..	+	..	..	..	+
,, 20	1,410	,,	..	..	..	+	..	..	+	..
,, 23	1,435	Reedbuck	+	..	..	..	..	..	..	+
,, 25	1,453	Hartebeeste	..	+	..	..	..	+	..	+
Oct. 6	1,471	Eland	..	+	..	..	..	+	..	+

film or by inoculation of a quantity of blood from the wild animal into healthy experimental animals.

TABLE III.—SPECIES OF TRYPANOSOMES FOUND IN THE BLOOD OF WILD ANIMALS IN THE SLEEPING-SICKNESS AREA, NYASALAND, AND THE NUMBER OF TIMES EACH WAS FOUND.

Number of animals	*T. brucei* vel *rhodesiense*	*T. pecorum*	*T. simiæ*	*T. capræ*	*T. ingens*
180	14	26	3	20	3

In every 100 wild animals living in the Sleeping-Sickness Area, Nyasaland, taken at random, the following numbers may be expected to be found infected with these species of trypanosomes.

TABLE IV.—PERCENTAGE OF ANIMALS INFECTED BY THE DIFFERENT SPECIES OF TRYPANOSOMES.

T. brucei vel *rhodesiense*	*T. pecorum*	*T. simiæ*	*T. capræ*	*T. ingens*
7·8	14·4	1·7	11·1	1·7

TABLE V.—THE SPECIES OF ANIMALS DEALT WITH, THE TOTAL NUMBER EXAMINED, THE NUMBER FOUND INFECTED, AND THE SPECIES OF TRYPANOSOMES BY WHICH THEY WERE INFECTED.

Animal	Total number examined	Number found infected	*T. brucei* vel *rhodesiense*	*T. pecorum*	*T. simiæ*	*T. capræ*	*T. ingens*
Eland ..	10	6	..	6	..	1	..
Sable ..	5	0	..	..	..	..	..
Waterbuck ..	13	9	3	1	..	8	..
Koodoo ..	3	2	..	2	..	..	..
Bushbuck ..	10	7	..	7	..	1	..
Hartebeeste	35	6	5	1	..	..	..
Reedbuck ..	19	12	3	1	..	9	1
Oribi	26	4	1	1	..	1	1
Duiker ..	7	2	1	..	..	..	1
Buffalo ..	9	2	..	2	..	..	..
Lion	1	0	..	..	..	..	..
Hyæna ..	3	2	..	2	..	..	..
Elephant ..	2	0	..	..	..	..	..
Warthog ..	33	7	1	3	3	..	..
Wild cat ..	3	0	..	..	..	..	..
Porcupine ..	1	0	..	..	..	..	..
Total ..	180	59	14	26	3	20	3

The next table gives the percentages of the different trypanosomes occurring in the wild animals. The numbers are too small to be taken literally, but it is interesting to learn that in this fly-district the waterbuck, hartebeeste, reedbuck and duiker are

dangerous neighbours to man; the eland, koodoo, bushbuck and buffalo to cattle, goats and sheep; and that the warthog is the only animal which harbours *T. simiæ*, the lightning destroyer of the domestic pig.

TABLE VI.—PERCENTAGES OF DIFFERENT SPECIES OF TRYPANOSOMES HARBOURED BY WILD ANIMALS IN THE FLY AREA.

Animal	Number examined	*T. brucei* vel *rhodesiense*	*T. pecorum*	*T. simiæ*	*T. capræ*	*T. ingens*
		Per cent	Per cent	Per cent	Per cent	Per cent
Eland	10	..	60	..	10	..
Sable	5	..	..	..	..	..
Waterbuck	13	23	8	..	61	..
Koodoo	3	..	66	..	..	..
Bushbuck	10	..	70	..	10	..
Hartebeeste	35	14	3	..	..	..
Reedbuck	19	16	5	..	47	5
Oribi	26	4	4	..	4	4
Duiker	7	14	..	..	..	14
Buffalo	9	..	22	..	..	..
Lion	1	..	..	..	..	..
Hyæna	3	..	66	..	..	..
Elephant	2	..	..	..	..	..
Warthog	33	3	9	9	..	..
Wild cat	3	..	..	..	..	..
Porcupine	1	..	..	..	..	..

CONCLUSIONS.

(1) 31·7 per cent. of the wild game in the fly-country below Kasu Hill harbour pathogenic trypanosomes.

(2) The species of trypanosomes found are *T. brucei* vel *rhodesiense* 7·8 per cent., *T. percorum* 14·4, *T. simiæ* 1·7, *T. capræ* 11·1, and *T. ingens* 1·7.

(3) It is self-evident that these wild animals should not be allowed to live in "fly-country," where they constitute a standing danger to the native inhabitants and the domestic animals. It would be as reasonable to allow mad dogs to live and be protected by law in our English towns and villages. Not only should all game laws restricting their destruction in "fly-country" be removed, but active measures should be taken for their early and complete blotting out.

(4) It must be strictly borne in mind that this only refers to wild animals living in fly-areas. No pathogenic trypanosomes have, up to the present, been found by the Commission in the blood of animals living in fly-free areas.

DAIRIES AND COWSHEDS, THEIR EFFECT UPON THE PURITY OF THE MILK SUPPLIED TO MILITARY HOSPITALS, TROOPS AND MARRIED FAMILIES.

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It is proposed to give in this article some of the most important details in the construction of a model dairy and cowshed, with illustrations; and also to indicate the chief points which should be noted in connection with the sanitary upkeep of the dairy itself, including the treatment of the milk from the time of milking to actual delivery in barracks. Extracts from the Model Regulations of the Local Government Board "Dairies, Cowsheds and Milkshops," on the subject are quoted, and notes on the collection of samples of milk for analysis are included.

Although milk does not actually enter into the diet of the soldier, except while under treatment in hospital, it is very necessary that the milk issued to military hospitals should be under strict sanitary supervision, in order to ensure a pure supply, also to guard against disease from this source, and to have a good and wholesome article at all times available for the use of the troops and married families.

Special Conditions of Contract for Milk.

It will not be out of place, first of all, to give the specification and the special conditions usually laid down in contracts for the supply of milk to military hospitals, viz: "The milk shall be supplied in sealed metal cans and shall be new and of good quality, and in the same condition as obtained from healthy well-fed cows; it shall be delivered fresh morning and evening where required.

"The contractor expressly undertakes to adopt and rigidly conform to such sanitary regulations as may be necessary to ensure a supply of uncontaminated milk, and in respect to his special obligation the farm from which the milk is obtained will be reported upon by the sanitary officer or such medical officer as the General Officer Commanding may select for this duty, and no milk is to be supplied except from farms which have been inspected and reported on as satisfactory sources of supply. The cattle in the farm will also be inspected by a military veterinary officer at such stations where one is available. In addition the General Officer Commanding or the officer acting on his behalf, without giving notice, shall have access

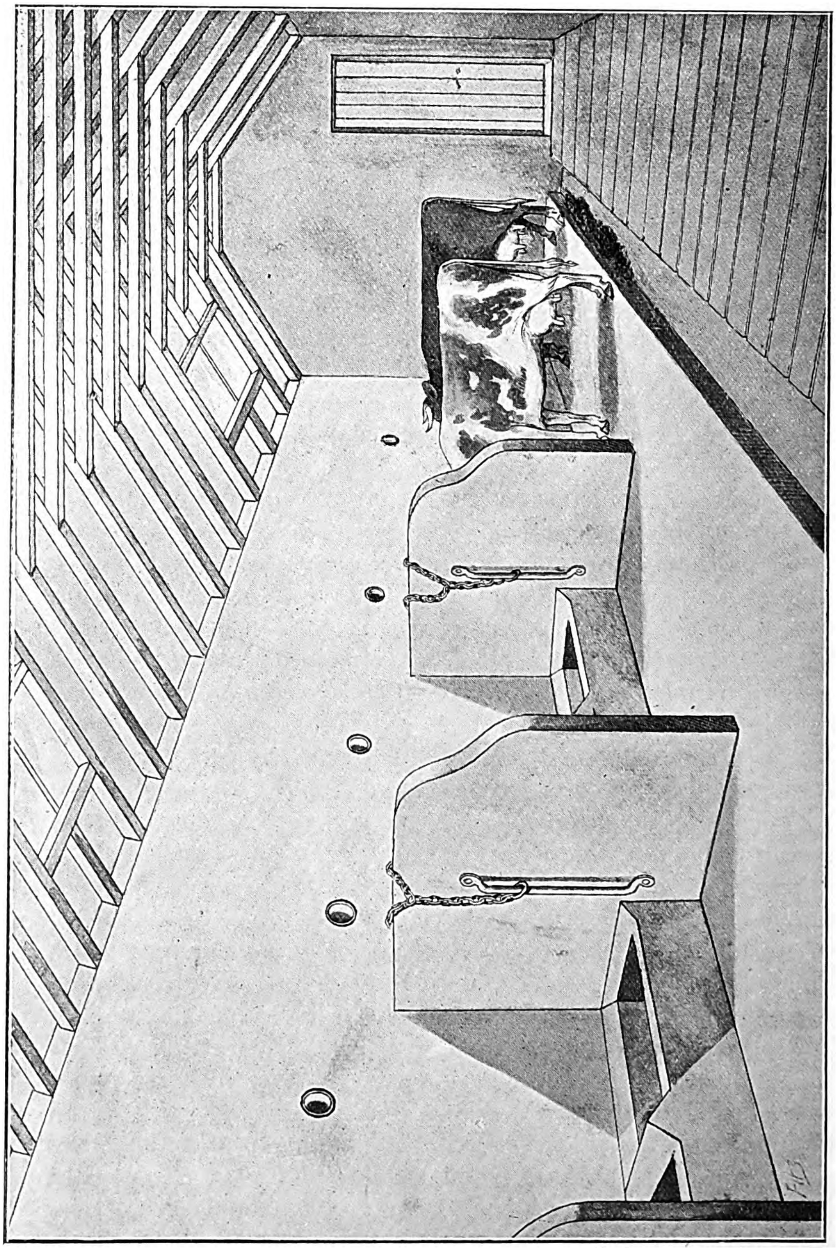
at all reasonable hours to the farm from which the milk is supplied, and may inspect the surroundings, the dairy, the water used in washing the pails and receptacles, as well as the manner in which the cows are housed and fed.

"Additional inspection may also be made from time to time by an officer holding a certificate of proficiency from the Royal Sanitary Institute, the Sanitary Authorities of the London Central Meat Market, or from the Medical Officers of Health at either Edinburgh or Birkenhead, deputed by the General Officer Commanding, and this officer may reject any article submitted to him if he be of opinion that it is not equal to what is required by the contract, and notwithstanding it may have already been passed under the ordinary inspection. Should rejection take place under this special inspection the contractor may be required to replace the rejected supplies or other articles may be purchased as provided in Clause 5. The contractor shall also be liable to pay by way of liquidated damages, and not as a penalty, a sum equal to 10 per cent of the value, at contract rates, of the supplies so rejected."

It will be seen from these conditions of contract that dairies supplying milk to military hospitals are liable to frequent inspection and supervision. Where "passes into barracks" to supply troops are granted to proprietors of dairies, it is specified that such dairies shall be at all times open to inspection by a medical officer. Unfortunately, in some instances, this is practically impossible as the milk is not delivered to the barracks direct from the dairy farm, but is sent by rail, in many cases from a long distance, to a depot in the town or village, as the case may be, whence it is distributed.

There is no doubt that the existing method of housing cows stands much in need of improvement, as the lack of proper accommodation induces a high mortality and tends to make the yield of milk low. A proper standard of cleanliness is practically unattainable in most cowsheds, and economy in food and materials is almost impossible; as a result, the whole business of attending to cows, &c., becomes a drudgery instead of being interesting, attractive and remunerative, and it consequently induces, in the majority of persons, a dislike for dairy work in general.

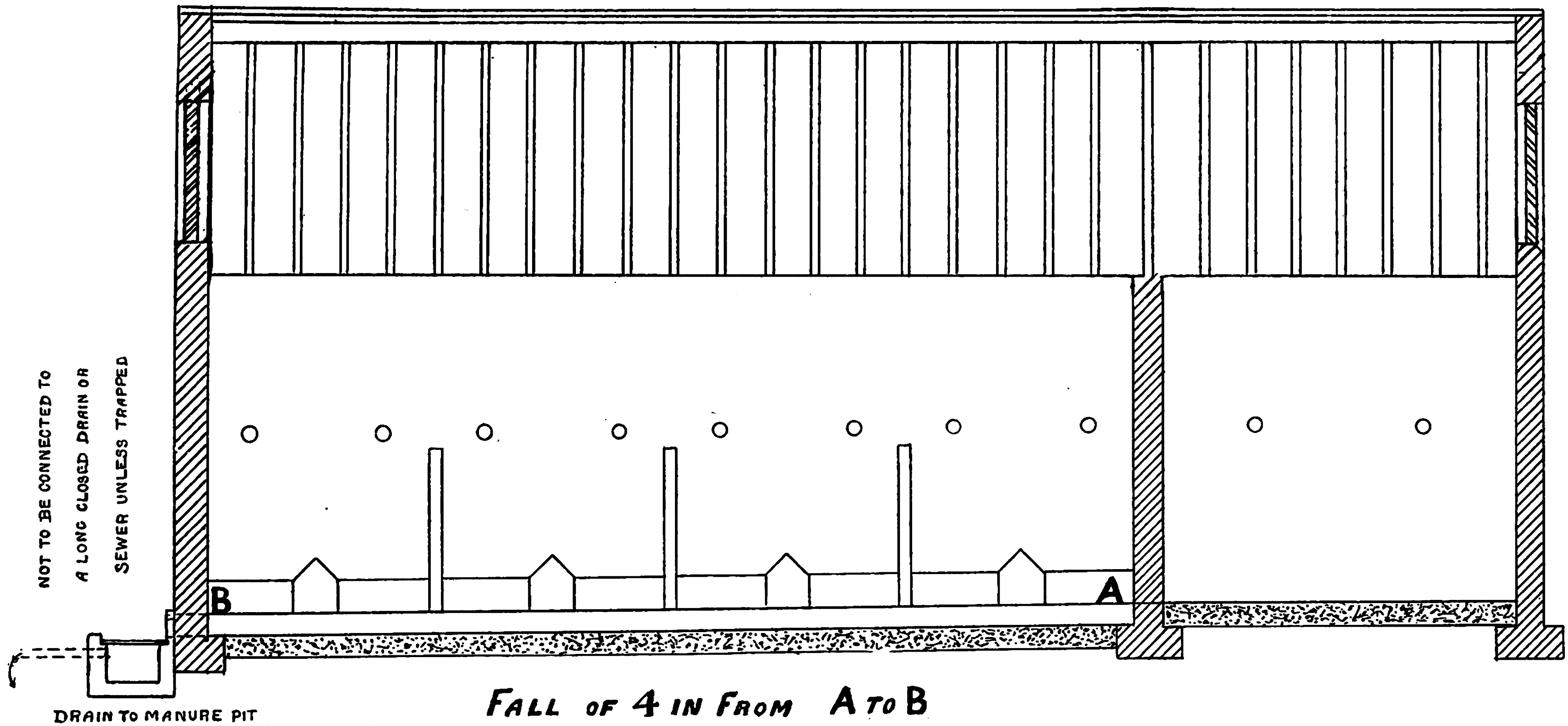
The necessity for all cowsheds being kept in a satisfactory sanitary condition is obvious when we consider that the quality and quantity of the milk depends largely upon the health of the cows, and that the consumers are liable to suffer if the milk is unwholesome.



THE INTERIOR OF A MODEL COWSHED.

By the courtesy of the Department of Agriculture and Technical Instruction, Ireland.

DRAWINGS FOR COW HOUSE IV



LONGITUDINAL SECTION AA.

SCALE 1" = 5 FEET.

By the courtesy of the Department of Agriculture and Technical Instruction, Ireland.

The Construction of the Cowshed.

"A cowkeeper shall not cause or allow any cowshed in his occupation to be occupied by a larger number of cows than will leave not less then 800 ft. of air space for each cow. Provided as follows: No space shall be reckoned which is more than 16 ft. above the floor; but if the roof or ceiling is inclined, then the mean height of the same above the floor may be taken as the height thereof for the purpose of this regulation." (Local Government Board, Model Regulations, Dairies, Cowsheds and Milkshops, Part II.)

The cowshed should be situated if possible with the main opening facing south, on ground naturally dry and with a good fall for drainage, and should also be properly constructed and ventilated. The minimum air space usually allowed for each cow is 600 cubic ft., but as much as 800 to 1,000 cubic ft. for each adult beast is often provided.

Ventilation.

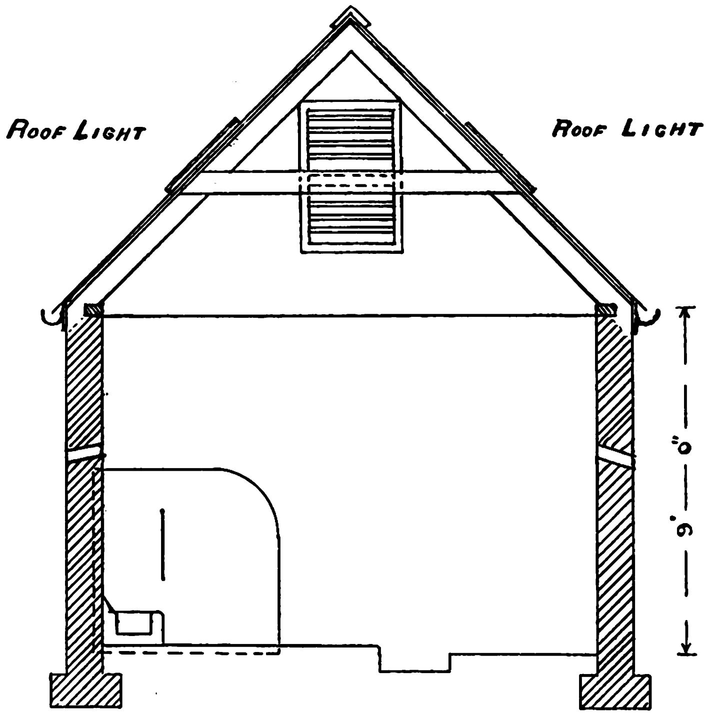
"Every cowkeeper shall cause every cowshed in his occupation to be sufficiently ventilated, and for this purpose to be provided with a sufficient number of openings into the external air to keep the air in the cowshed in a wholesome condition." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops Part I.)

Good ventilation without draught is essential, and is of more importance than air space, for no matter how large the cowshed is, the air will eventually become impure if no provision is made for changing it. The cowshed should not, however, be too large as the heat given out from the bodies of the animals would not then be sufficient to keep it warmed. Unfortunately, owing to the fact that cows yield more milk at a medium temperature than at a cold one, the commonest defect of cowsheds is defective ventilation, partly due to the desire to keep up the temperature of the shed which is so favourable to the secretion of milk.

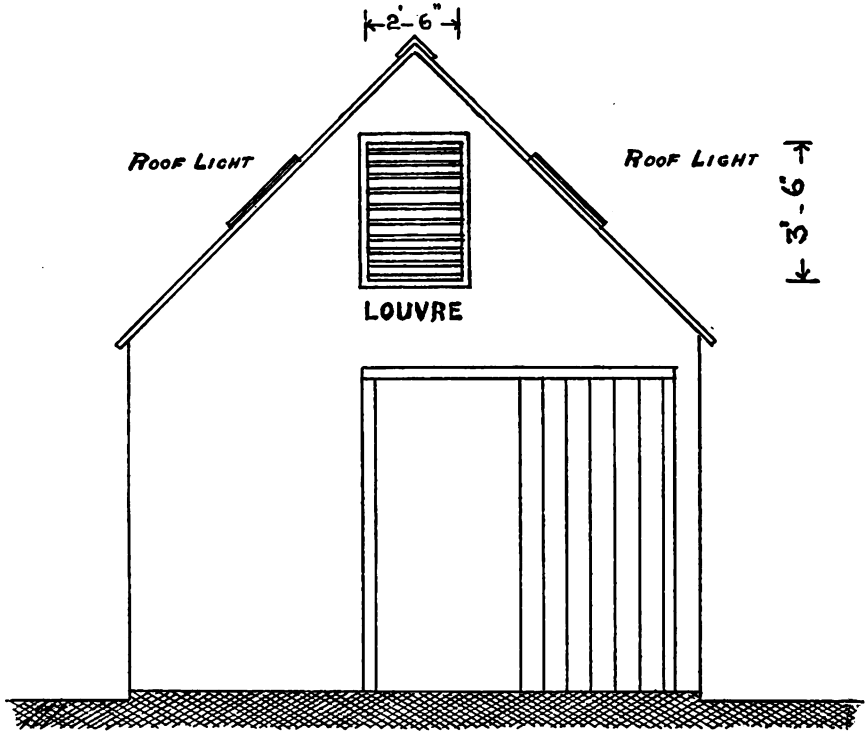
Ventilation is usually provided in cowsheds by openings in the walls and roof, such openings being covered with louvred boards or sliding shutters.

In the illustration given, the ventilation is obtained by 5 in. fire-clay pipes, as inlets, suitably covered with wire gauze, in order to prevent the entrance of flies, one being opposite each cowstall. In each end gable is an outlet (30 in. × 18 in.) which in exposed situations would be covered with louvred boards. This method of

DRAWINGS FOR COW HOUSE III



SECTION



END ELEVATION

SCALE 1" = 5 FEET.

By the courtesy of the Department of Agriculture and Technical Instruction, Ireland.

ventilation is cheap and simple, and one which has been found to act quite satisfactorily. Ventilation should never be made in partition walls, but outside walls should be utilized. The size of the area of the outlets should not be less than 20 sq. in. for each cow.

All windows and doors should be left open when the cows are not actually in the shed, in order to ventilate it as much as possible.

Lighting.

"Every cowkeeper shall provide that every cowshed in his occupation shall be sufficiently lighted with windows, whether in the sides or roof thereof." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part I.)

Lighting is an important factor in the cowshed, as no cowman can give proper attention to the feeding and milking of the cows and cleaning of the house without sufficient light. A south or south-westerly aspect is therefore best for the site of the cowshed. The windows should be made to open and be kept cleaned.

Drainage and Floors.

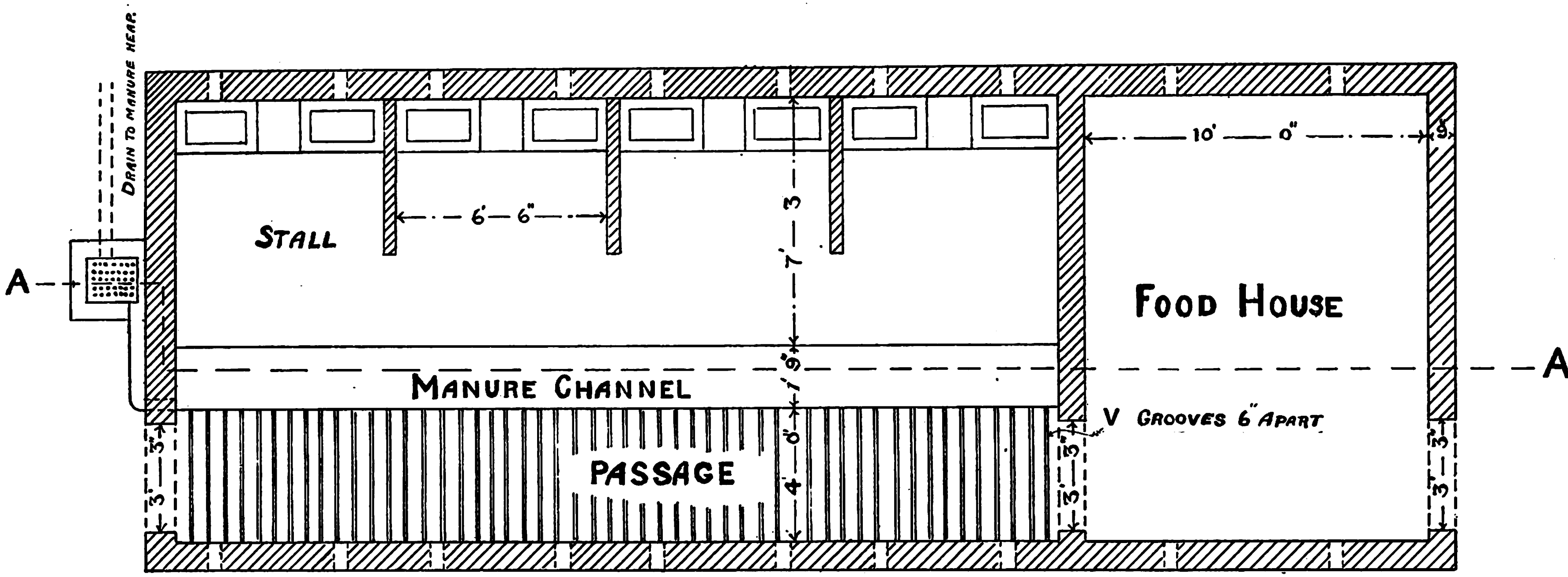
"Every cowkeeper should cause the drainage of every cowshed in his occupation to be so arranged that all liquid matter which may fall or be cast upon the floor may be conveyed by a suitable open channel to a drain inlet situated in the open air at a proper distance from any door or window of such cowshed, or to some other suitable place of disposal which is so situate. He shall not cause or suffer any inlet to any drain of such cowshed to be within such cowshed." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part I.)

The floor of the cowshed should be constructed of some non-porous material which can easily be washed down. This should be either in the form of brickwork set in cement, concrete flooring or blue Staffordshire grooved bricks, preferably the latter if expense is not considered.

A channel must be made for the reception of the excrement in order to prevent it from falling on to the stall and so dirtying the animals when they lie down. This channel should be at least 1 ft. 9 in. wide, and should be so placed that the hind feet of the cows stand immediately on its edge, as shown in the illustration. Its bottom should not be curved, but sloped away from the animals, so that the liquid can flow away from the solid excreta and run into the catch pit or drain, which must be trapped outside the cowhouse between it and the cesspit or other system of drainage. The

DRAWINGS FOR COW HOUSE

I



PLAN

SCALE 1" = 5 FEET.

By the courtesy of the Department of Agriculture and Technical Instruction, Ireland.

passage and manure channel shown in the illustration should be finished off smooth and the solid matter can then be easily and quickly taken up. The passage should have V-shaped grooves about 6 in. apart, to keep the cows from slipping.

Divisions.

The divisions marking off the space for each pair of cows, or for one cow only if desired, should be made either of iron or concrete; if they are made of wood they last but a short time and are more difficult to keep clean. The size should be 4 ft. 9 in. by 4 ft. 9 in. by 4 in., and to both sides should be attached iron bars to which chains are fastened, the cows can thus be chained up during the process of milking. These divisions are necessary if only to prevent the animals from standing across the stalls, soiling their beds and also their bodies when they lie down. The divisions, if made of concrete, should be limewashed; if of iron, painted.

Walls.

The walls of the cowhouse should be rendered with cement on the inside up to their full height, and limewashed. An opening 4 in. by 3 in. high should be provided in the end wall, to conduct the liquid manure from the channel into the catchpit.

Food House.

A suitable store for food is an important item in connexion with the cowshed and should be conveniently near; this is shown in the illustration.

Feeding Troughs.

These may be made either of iron, concrete or glazed earthenware set in concrete. In any case they should be rounded at the corners, so that no food can be left therein and become sour or musty.

Water Supply.

"Every cowkeeper shall keep in, or in connection with, every cowshed in his occupation a supply of water suitable and sufficient for all purposes as may from time to time be reasonably necessary. He shall cause any receptacle which may be provided for such water to be emptied and thoroughly cleansed from time to time as often as may be necessary to prevent the pollution of any water that may be stored therein, and where such receptacle is used for the storage only of water he shall cause it to be properly covered and ventilated, and so placed as to be at all times readily accessible." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part I.)

It is most essential that the water supply to a dairy should be of the highest quality and sufficient for all purposes, and where possible from a main supply. If there is no constant water supply available, water from a deep well which has been previously examined and found satisfactory could be utilized. No matter from what source the water supply be, samples should be taken periodically and examined both chemically and bacteriologically, as to its fitness for use in the dairy. If storage tanks are utilized, they should be made of galvanized iron, situated in some convenient position, ventilated, provided with properly fitting covers, and be not less than 6 ft. above the floor level. The tanks must be thoroughly cleaned out and limewashed on the inside at least once a year; they should have no connexion whatever with any water-closet or drain by means of a waste pipe.

Limewashing.

"Every cowkeeper shall cause the ceiling or interior of the roof and the walls of every cowshed in his occupation to be properly limewashed twice at least in every year; this is to say, once during the month of May and once during the month of October, and at such other times as may be necessary, provided that this requirement shall not apply to any part of such ceiling, roof, or walls, that may be properly painted, or varnished, or constructed of, or covered with, any material as to render the limewashing unsuitable or inexpedient, and that may be otherwise properly cleansed." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part I.)

It is usual in the service to insist upon all dairies and cowsheds being limewashed throughout four times a year—viz., February, May, August and November—in order to keep these buildings sweet and clean. Once every year the lime should be scraped off before putting on the new coat. The lime should be put on "hot," as in this form its disinfecting action is more efficient.

Cleansing.

"Every cowkeeper shall cause every part of the interior of every cowshed in his occupation to be thoroughly cleansed from time to time, as often as may be necessary to secure that such cowshed shall be at all times reasonably clean and sweet. He shall cause the floor to be thoroughly swept, and all dung and other offensive matter to be removed from such cowshed as often as may be necessary, and not less than once in each day." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part I.)

It is the usual custom in well conducted dairies to wash down the floors of the cowsheds twice daily, weather permitting, in order to get rid of as many impurities as possible, and for this reason it is advisable to have a permanent water supply actually laid on to the cowshed, but where this is impracticable rain water could be utilized.

Removal of Manure.

Manure must not be allowed to remain in or near the cowshed or dairy, but should be cleared away at least twice a day to prevent any nuisance arising. In the case of the cowshed, manure and bedding should be removed before milking takes place. Formerly it was customary to pile up the manure in the farmyard adjoining the cowshed and there let it rot. This practice is of course undesirable and insanitary, and should be strictly prohibited, as it is well known that flies breed in large numbers in manure.

Properly drained manure pits should be constructed in the yard, with impervious floors; as an additional precaution they could be fitted with covers in order to protect them from flies and rain. In connection with some modern cowsheds a cart (tumbler) is utilized to carry away the manure directly it has been taken up out of the shed, a tumbler being kept permanently for this purpose outside the cowshed. This method of removal does away with the use of manure pits. In many dairy farms, especially those which have been in use a number of years, the yard referred to above is very low-lying and not drained in any way; a very large amount of material would be required to bring these yards up to a suitable level. This is particularly noticeable with some of the dairies in the counties of Hampshire and Wiltshire.

A system of drainage should be installed in order to prevent water from accumulating in the yard, such a system should be kept clean by frequent flushing with water.

The Keeping of Swine.

"It shall not be lawful for any person following the trade of cowkeeper or dairyman or purveyor of milk to keep any swine in any cowshed or other building used by him for keeping cows or in any milk-store or other place used by him for keeping milk for sale." (Dairies, Cowsheds and Milkshops Order, 1885, Section 12.)

The keeping of pigs, poultry, &c., near a dairy or cowshed is undesirable; in any case the former should not be allowed nearer than 60 ft. from the dairy or cowhouse.

(*To be continued.*)

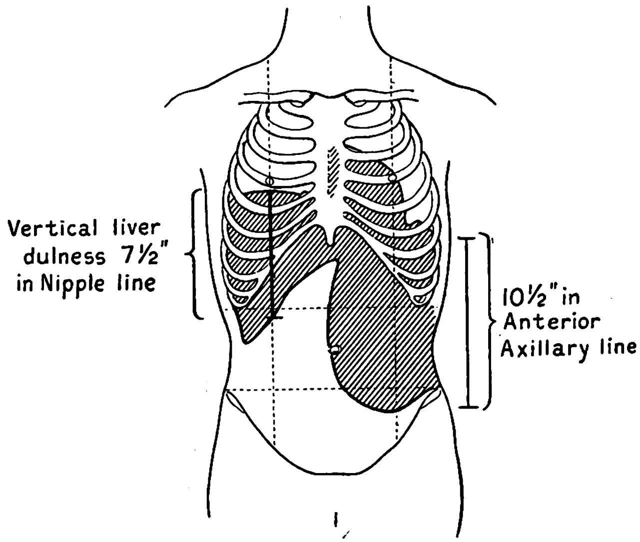
Clinical and other Notes.

KALA-AZAR IN AN ADULT FROM MALTA.[1]

By Fleet-Surgeon P. W. BASSETT-SMITH, C.B., M.R.C.P.Lond.
Royal Navy.

The cases of infection of adults with the Mediterranean form of kala-azar are still comparatively few; the following one is therefore worth recording. A man, aged 29, in the Royal Navy, while on the Mediterranean station was for some months employed on shore at the rifle

Pulse Tracing.



Girth, 33½ in. Blood-pressure = 106 mm. of Hg. Pulse tracing shows dicrotic wave, but not so marked as before.

range at Malta, where he was frequently in contact with native dogs. About eighteen months after, he was admitted to Chatham Hospital for anæmia and furunculosis; a very large spleen was found and Surgeon

[1] Published by permission of the Medical Director-General of the Navy.

A. V. J. Richardson, R.N., discovered Leishman bodies in a smear from a splenic puncture. He was then sent to Greenwich. Since that time the bodies have four times been demonstrated by liver puncture, but have never been found in the peripheral blood. The organisms grow well on Novi Nicolle McNeal media, but not in citrated blood. His serum gives a positive Wassermann reaction, but no agglutination with *Bacillus typhosus* or *Micrococcus melitensis*, and the blood-picture shows a moderate degree of anæmia and a marked leucopenia. The case has been four months under treatment with regular intra-muscular injections of atoxyl and a vaccine made from the flagellates of his own parasite. The bodies, at the last liver puncture, were very scarce (formerly very abundant) and his weight has slightly increased, but the liver and spleen are still very large. There seems to be no doubt that this is an example of an adult infection of the *Leishmania infantum* parasite, contracted at Malta, possibly through the intermediary of native dogs. The occurrence of any case with a large spleen found in the Naval and Military services should now, at Malta, always raise the suspicion of this disease, which will probably become more common. I would suggest for the kala-azar group the term of "Parasitic Splenomegaly," which would be wide enough to cover all forms found in China, India, Africa, and the Mediterranean, not limiting the disease geographically or to any age.

DEATH FROM SYPHILIS OCCURRING NINE DAYS AFTER INJECTION OF SALVARSAN.

By Captain J. H. DUGUID, and Lieutenant W. T. GRAHAM.
Royal Army Medical Corps.

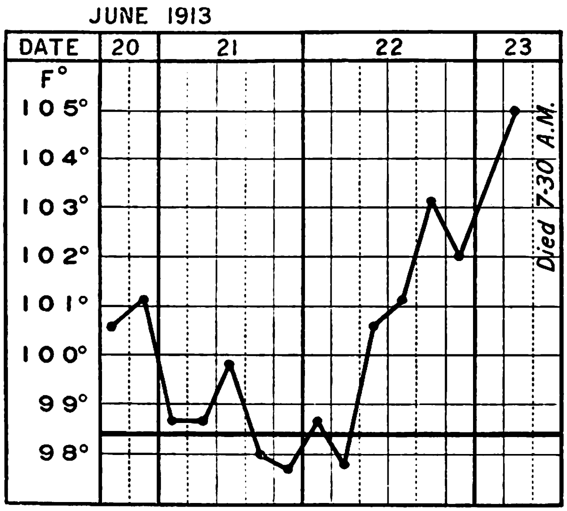
In view of the number of times which death has ensued soon after the administration of salvarsan, without the exact cause having been demonstrated, notes of the following case would appear to be of interest.

Driver C. R., aged 28, was transferred on June 11, 1913, to the Station Hospital, Calcutta, from an out-station, for treatment by salvarsan. Eighteen months previously he had contracted primary syphilis, followed by moderately severe secondary symptoms, which rapidly yielded to treatment by mercurial injections, and no further signs of the disease had been noted. In all, 27 gr. of metallic mercury had been administered at his own special request. The patient was transferred to Calcutta for treatment with salvarsan, though his cure by mercury might have been considered nearly complete.

After admission to hospital the patient was carefully examined; he was spare, but healthy in appearance, and showed no signs of active

disease, nor did he complain of anything. Having been prepared in the usual way, 0·6 grm. of salvarsan was injected intravenously on June 14, 1913. The usual precautions were taken, and the reaction was of the slightest.

Until the morning of the 20th the patient showed no unusual symptoms, and was to have been discharged that day, but on that particular morning he complained of headache and malaise, and had a rise of temperature. Next morning (that is on the seventh day after the injection of salvarsan) he was seized with an epileptiform fit, which commenced in both hands and arms. For some time after the fit he remained unconscious and cyanosed with regular and moderately contracted pupils. Unconsciousness gradually became less profound, and by 5 p.m.



he could take a little nourishment. It was now evident that there was no paralysis, and that the reflexes were normal. Signs of cerebral irritation were, however, well marked. The patient did not speak, or pay any attention to words addressed to him, but he very much resented being handled. During the night other fits supervened accompanied by general convulsions and involuntary micturition. On June 22 (eighth day after injection) the patient remained unconscious and was obviously getting weaker; during the night Cheyne-Stokes respiration set in, and at 7.30 on the morning of the 23rd he died. The usual treatment had been adopted, including ice to the head; administration of bromides and small doses of chloral. Later recourse was had to cardiac stimulants. Liquid nourishment was given as freely as possible throughout.

The post-mortem examination, which took place three hours after

death, revealed the following condition: Abnormal adhesion of the dura mater to the vault of the skull; congestion of the meninges; excess of intracranial fluid. The vessels of the brain were engorged, and on making a section of the cerebrum a gumma 4 c.m. in diameter was disclosed; this was situated just external to the anterior horn of the right lateral ventricle. In addition to the usual caseous matter this gumma contained a considerable amount of fluid blood of a brown colour, pointing to hæmorrhage of some days' standing. The other internal organs showed no signs of active disease.

Horizontal section of right cerebral hemisphere showing position of gumma.

The patient showed no obvious signs of disease before treatment by salvarsan. It is open to question whether an examination of the fundus oculi would have disclosed the existence of a cerebral tumour.

It is not improbable that the drug produced a local reaction in the lesion, and thus induced the symptoms which otherwise might have remained in abeyance.

Perhaps continued administration of mercury and potassium iodide would have been safer treatment in this case, but yet are we not justified in risking an occasional untoward reaction on account of the marked benefit which follows in the great majority of cases from the administration of salvarsan?

A CASE OF HYDROPHOBIA.

By Assistant-Surgeon P. BELL.
Indian Subordinate Medical Department.

Lance-Corporal W. G., aged 24, service six years and four months, (Wireless) Signal Company, Sappers and Miners, was admitted to hospital at 7.45 a.m. on April 10, 1913.

Previous History.—There was no history of previous illness or of any dog bite. Four or five months ago in Roorkee a mad dog had run through the Company's camp, but no men or dogs were known to have been bitten. A week previous to the patient's illness two of the Company's dogs had died suddenly half an hour after eating a large meal. They had shown no signs of illness previously and the belief was that they had been poisoned. The patient had carried these dogs out of the lines after they died.

Condition on Admission.—The patient complained of "fever." His temperature was 99° F. On being given a dose of diaphoretic mixture he seemed to choke, and then stated that on that morning he had tried to drink some soda-water and choked each time he attempted to do so, and that was his real reason for reporting sick.

During the day the spasms became more frequent, but his mind was perfectly clear, and he said that if only he could get rid of the choking sensation he would be all right. He was extremely thirsty, but the very sight of liquid set up a spasm of the pharynx and respiratory muscles. He was, however, able to walk about the ward, and even ate a slice of dry bread at 3.30 p.m.; morphia ½ gr. was given at 5 p.m., but had no sedative effect whatever.

From 6 p.m. onwards he got rapidly worse. The spasms were brought on by the mere mention of water and by the sight of any stranger entering the ward. At 10 p.m. he was in great distress, and in his convulsions he flung himself off the bed and could hardly be restrained by three men. At 2 a.m. on the 11th he knew that he was dying and shook hands with those attending on him. He began to spit and vomit, and struggled for breath. A small quantity of chloroform was administered by Captain Trafford, I.M.S. This quieted the spasms and the patient died about 3 a.m.

The case is interesting on account of the obscurity with which the source of infection is surrounded. The most careful inquiries have failed to elicit any information as to the deceased having had anything to do with a rabid dog at any time.

GUNSHOT WOUND OF THE FACE.

By Major A. M. MacLAUGHLIN.
Royal Army Medical Corps.

The following short description of an uncommon injury, caused by a Service pattern rifle, may be of interest to officers of the corps.

At 11 p.m. on May 4, Private C., of the Royal Dublin Fusiliers, was brought to hospital suffering from what appeared to be a large incised and lacerated wound of the face, presenting the appearance as if a bayonet or similar instrument had been thrust upwards through the upper lip in the middle line, completely splitting the lip and nose and cutting a deep cleft in the forehead as far as the hair. The soft tissues of the cheeks were torn from the bones for a distance of about an inch on each side, so that each with about one half of the nose fell outwards at the side, leaving a gaping wound measuring about four inches across its deepest and widest part, about six inches long, and giving a clear view into the posterior nares. Blood was oozing freely from all portions of the wound, but there was no arterial hæmorrhage. On closer inspection and on wiping away some blood, it was found that a portion of the under surface of the upper lip was blown away, leaving charred edges, also the nasal septum and portions of the nasal bones, and that a groove had been cut in the frontal bone. Chloroform was administered and the edges of the wound were brought together with silkworm-gut sutures, using both superficial and deep ones. Except for a little sloughing in the under portion of the upper lip where the bullet entered, the entire length of the wound healed by primary union. A large sinus remained for some days between the anterior portion of the mouth and the nasal cavities, where the soft tissues had been torn away from the bones, but this afterwards closed by granulation. Except for an irregular linear scar, practically the only external deformity now existing is some widening and flattening of the bridge of the nose, and the anterior nares are also somewhat contracted and distorted, owing to the septum having been blown away and the soft parts in consequence collapsing. The wound was a self-inflicted one, and it would appear that he found the rifle too long to place the muzzle inside his front teeth and at the same time keep his finger upon the trigger. It is also of interest to note that holding the rifle as he did and in order at the same time to pull the trigger with his finger, it was necessary to throw his head backwards, otherwise I fear that the injuries would not have required any surgical treatment. Amongst other interesting points in this case may be mentioned: (1) The small amount of charring, though the muzzle of the rifle must have been practically touching the lip; (2) the rapid healing of the wound, showing how little the vitality of the tissues was impaired; and (3) the fact that the wound had, on first inspection, more the appearance of an incised one with lacerated edges, such as might be caused by a blunt cutting weapon, than one

caused by the explosive action of a Service rifle discharged while practically touching the part.

I am indebted to Lieutenant-Colonel C. A. Lane, R.A.M.C., Officer Commanding Station Hospital, Madras, for his permission to publish these notes.

THE PROPHYLACTIC USE OF QUININE.

By Lieutenant-Colonel H. N. THOMPSON.
Royal Army Medical Corps.

In order to test the value of quinine as a malaria prophylactic, some experiments were carried out in the garrison of Lucknow during the years 1910 and 1911. During the year 1912 quinine was only given to men known to be infected. The results of these experiments are given in the following notes, extracted from the annual return of the station. It was noted that when quinine was regularly administered, towards the end of the season, a large number of the men became limp and languid and quite unfit for any hard exercise.

From June 15 to October 31, 1910, quinine prophylaxis was carried out systematically among the British troops in Lucknow, 5-gr. doses every second day being given to each man in the garrison, with the exception of one company of each infantry battalion which was exempted in order to act as a control.

The attached table shows the incidence *of all fevers*, by squadrons and companies, during the above mentioned period, enteric and paratyphoid fever alone being excluded. The O.C. Station Hospital specially requested that he should not be informed which companies were not receiving quinine in order that he might preserve a perfectly open mind when admitting men for fever. As it skirts the lines and Sudder Bazaar, the old Haidar Ali Canal still remains the principal source of malaria, any of its large stagnant pools being a sure find for anopheles larvæ. The attached table tends to show that, at any rate in a mild-malaria season such as the one just passed, prophylactic quinine is of little or no value, the incidence of cases among the exempted companies not being above the average.

There can be no question as to the regular administration of the quinine, as this was carried out under the direct supervision of company officers, who took a great interest in the subject.

There were 140 admissions during 1911. This includes the whole year. Blood smears were examined in all cases of fever, and proved positive in the majority of those diagnosed malaria. Prophylactic quinine, with the accompaniment of sulphate of magnesia, was given to the troops from August 11 to November 11, with the exception of the King's Own

Regiment, which was kept free from quinine as a control. Ten grains of quinine were administered on two consecutive days each week.

The incidence of malaria in the British troops was as follows:—

Corps	Average annual strength	Number of admissions	Remarks
8th Hussars	465	45	Quinine.
1st King's Own Regiment	768	26	No quinine.
1st Highland Light Infantry	805	46	Quinine.

It will be seen that there is an appreciable difference in the case of the King's Own Regiment.

In 1912 there were but 59 admissions under this heading as compared with 140 in 1911. Of these 27 occurred during December, and came from two companies of the 1st King's Own Scottish Borderers who had been quartered in Delhi Fort during the past summer. Both these companies seem to be very heavily infected; they are being kept under close observation, and have been all supplied with mosquito curtains since their arrival here. The diagnosis was confirmed by the microscope in 85 per cent of the cases. Those contracted locally were almost all of the benign tertian variety, while the Delhi cases were mostly malignant tertian. Experience and careful experiment at this station have taught that prophylactic quinine is useless and perhaps harmful. (*Vide* previous reports.) I rely on protection by curtains while the season makes the use of these possible, and on the transference of the infected cases to hill stations as prophylactic measures. The improvement effected by the Public Works Department in the old Haidar Ali Canal has greatly reduced the mosquito population, and has doubtless contributed largely to the reduction of malaria; also the careful and frequent inspection of all natives employed in barracks.

No prophylactic quinine was given to British troops in 1912.

LUCKNOW, 1910.

8th Hussars, Strength 518.

Squadron	Malaria	Other fevers	Total	Remarks
"A"	5	5	10	—
"B"	7	12	19	Large incidence probably due to the fact that a large nullah containing stagnant water ran in close proximity to "B" Company's bungalows. The nullah was eventually drained.
"C"	2	5	7	—
"D"	4	8	12	—

Royal Artillery, Strength 390.

Battery	Malaria	Other fevers	Total	Remarks
R.H.A.	4	2	6	—
20th Battery	7	4	11	—

King's Own Regiment, Strength 1,036.

Company	Malaria	Other fevers	Total	Remarks
"A"	5	3	8	—
"B"	4	3	7	—
"C"	4	4	8	—
"D"	2	3	5	—
"E"	4	3	7	This Company received no prophylactic quinine.
"F"	4	7	11	—
"G"	3	1	4	—
"H"	6	0	6	—

1st *Highland Light Infantry, Strength* 1,062.

Company	Malaria	Other fevers	Total	Remarks
"A"	4	7	11	—
"B"	5	9	14	—
"D"	4	2	6	—
"F"	5	4	9	—
"G"	6	6	12	This Company received no prophylactic quinine.
"H"	6	10	16	No explanation can be given of the large incidence of fevers in this Company.
"I"	3	3	6	—
"K"	3	0	3	—

ELECTROLYTIC MEDICATION.

By Captain J. B. HANAFIN.
Royal Army Medical Corps.

I send the following as a suggestion for the practical and efficient treatment of that troublesome affection—warts.

Two warts which I had on my head resisted all attempts at removal for over twelve months. One which was removed with the knife at the expense of a scar grew again; recurrence also took place after the use of caustics. I then treated them with magnesium ions; after four applications they disappeared and did not recur.

The procedure was as follows: A 5 per cent solution of magnesium sulphate was used, and an electric current of about 0·004 to 0·006 ampere was employed. A small pencil of carbon was used as the positive electrode, as no ions being liberated by this the solution is not contaminated. A small pad of cotton wool soaked in a 5 per cent solution of magnesium sulphate was placed on the warts. The other electrode covered with a cloth and soaked in saline solution, to reduce skin resistance, was held in the hand of the patient. The current was allowed to pass for eight minutes at a time on four consecutive days.

The following advantages may be claimed for this method :—

(1) It is more efficient than any other method. Every cell of the wart is saturated by the ions introduced electrolytically.

(2) There is no disfiguring scar left as when warts are removed by the knife.

(3) No special apparatus is necessary; four cells can be obtained in most places. Four "Hellesen" dry cells, costing about eighteenpence apiece, answer admirably. When X-rays are not available, I would suggest the use of magnesium ions in rodent ulcer. Electrolysis with cocaine ions is most useful as a local anæsthetic.

A CASE OF ECLAMPSIA: RECOVERY.

By Captain S. E. LEWIS.
Royal Army Medical Corps.

The rarity, severity and gravity of this disease is sufficiently well known to render the notes of this case interesting, and, I hope, of some use to others, should they be called upon to treat a case. Before attempting to give the notes, a few facts in connection with eclampsia may not be out of place. According to recent statistics, eclampsia occurs in about 1 in 500 cases of pregnancy. The maternal mortality is stated to be 25 per cent; when the fits precede labour most cases are fatal, and also after twenty or more convulsions. The fœtal mortality is about 70 per cent, and at the seventh month or earlier 100 per cent. Labour complicated by eclampsia is nearly always premature, and it occurs most frequently in pregnant women whose urine up to the onset of the convulsions has never been examined.

The disease is peculiar to pregnant women; the convulsions seldom, if ever, occur before the fifth month, generally a short time before term, less frequently at term, and least frequently after labour. It may at once be said that at present nothing is definitely known as to the cause of the disease, although all authorities seem to agree that it is due to a poison circulating in the blood causing disease of the kidneys, as shown by the enormous amount of albumin usually present in the urine in cases of eclampsia. As regards the treatment, briefly it may be said that the best treatment may be summed up as follows :—

(*a*) To control the convulsions.

(*b*) To empty the uterus as soon as possible by whatever means this can be most safely done after the first convulsion (R. A. Gibbons, *British Medical Journal*, April 26, 1913).

(*c*) To remove as much of the poison from the blood as possible, and to dilute the remainder.

NOTES OF THE CASE.

Mrs. O. A., multipara, aged 29, came to the Military Families' Hospital, Devonport, on Tuesday morning, May 6, in order to notify her expected confinement. She looked very anæmic, the eyelids were somewhat "puffy," and she stated she was suffering from severe frontal headache of one week's duration.

On further questioning she admitted she had recently been passing less urine, and that for the past two days she had been "seeing black moving spots"; no history of diplopia or hemianopsia could, however, be obtained.

Examination showed she was between six and seven months pregnant, the fœtus alive, and the presentation a first vertex. The urine was very acid, sp. gr. 1020, and it became solid on boiling. The heart sounds were normal with the exception that the second aortic sound was accentuated. The apex beat was in the fifth space, just within the nipple line. The pulse 80, very hard, but regular.

The patient was at once admitted, put to bed, the diet limited to milk and barley water, and a smart purge.

I was called to see her at five o'clock in the afternoon as she was bleeding freely from the uterus; the hæmorrhage soon ceased, however, without any treatment as uterine contractions began, the external os being just open. The patient was, however, vomiting freely, only bile-stained mucus coming up, and she complained of severe headache.

Under treatment the vomiting ceased and she was given caffeine 3 gr., phenacetin 7 gr., for the headache.

At nine o'clock she was more comfortable. As regards the dilatation of the cervix little progress had been made, the contractions being weak and occurring at long intervals. A catheter specimen of urine again turned solid on boiling, but there were no twitchings or any signs of a convulsion.

At 3.30 a.m. I was called to her again as she had had a severe convulsion and before 4 a.m. four more convulsions had occurred; she was now in a very dazed condition and her tongue severely bitten.

On vaginal examination the cervix only admitted one finger; it was hard and irregular in outline from previous lacerations and the membranes were intact.

The case was evidently a very severe one, five convulsions having occurred in less than an hour; the patient was semi-conscious, the dilatation slight, the cervix rigid and irregular.

Forcible dilatations and delivery with forceps would take a long time (the main object of the treatment is to empty the uterus rapidly), lacerations of the cervix would almost certainly occur; the risk of sepsis would, therefore, be greater, especially when the patient's condition of lowered powers of resistance was taken into account.

I therefore considered that the patient's best chance of life was to perform abdominal Cæsarean section as soon as possible, and to control the fits in the meanwhile by the administration of chloroform at intervals.

Before 6 a.m. two more fits had occurred; preparations for the operation being now complete and assistance having been obtained, the rectum was thoroughly washed out, the catheter passed (only a small quantity of very dark urine being obtained), and she was removed to the theatre.

The operation was completed by 6.50 a.m., the child was alive but very premature and only lived a few hours. The uterus was very thick and the hæmorrhage moderately severe, but without much effect on the pulse, and this was no doubt beneficial in getting rid of some of the poison (venesection being strongly recommended with a full bounding pulse). The patient stood the operation well, and on being put back to bed she was placed in a small ward by herself between blankets, hot-water bottles applied, 2 pints of a solution of bicarbonate of soda, 30 gr. to the pint, injected *per rectum;* instructions were given to keep the patient on her side, and absolute silence to be maintained.

By 9 a.m. she was conscious, no more fits had occurred, but she complained greatly of "after pains," pain in the abdominal wound, and she was vomiting frequently. Her eyes were now completely closed by œdema. Temperature 97·4° F.; pulse 80.

Morphia $\frac{1}{6}$ gr. was ordered; the diet was limited to small quantities of hot water at frequent intervals, and the injection of 2 pints of bicarbonate of soda, 30 gr. to the pint, was repeated in the afternoon.

May 8.—Patient had a fair night, the vomiting has ceased, pain is less, and still more satisfactory, she now has no headache, there have been no more convulsions, and she is no longer troubled by muscæ volitantes. The eyelids are, however, still almost closed by swelling, and the abdominal wall is markedly œdematous, especially just above the symphisis pubis. Temperature 98·4° F., pulse 92, softer and regular.

Since the operation at 6 a.m. yesterday she has passed 29 oz. of urine, but there is no reduction of the amount of albumin present, the urine still turning solid on boiling.

The patient was allowed one pint of milk to-day, as much barley water as she could drink, and the injections of bicarbonate of soda solution were repeated.

May 10.—The patient's condition shows a marked improvement. The eyelids are not nearly so swollen, the œdema of the abdominal wall is much less, and during the past twenty-four hours 53 oz. of urine have been passed. The albumin has also decreased, only a thick cloud now appears on boiling. She had a very good night, complains of very little pain, and the lochial discharge is normal in all respects. The temperature is 98·8° F.; pulse, soft and regular, 82, and the bowels have been well opened after calomel 4 gr. and mist. alba 1 oz. this morning.

The diet was increased to 3 pints of milk, dry toast, weak tea, and bovril.

May 14.—A steady improvement maintained, temperature and pulse are normal, and there are now no signs of œdema.

During the past twenty-four hours 67 oz. of urine were passed, only a trace of albumin being present.

The superficial stitches in the abdomen were removed to-day; the wound has healed *per primam.* The patient asked to have a large wart on her lower lip removed, and this has been done by means of CO_2 snow.

May 19.—To-day for the first time the urine is free from albumin.

There has been a slight rise in temperature to 99° F. in the evening for three days due to increased mamary secretion, this being somewhat late in making its appearance.

She was now on practically full diet, and was allowed to sit up.

May 26.—She was allowed up for a few hours to-day.

June 7.—The patient was discharged from hospital.

My best thanks are due to Mr. Roberts, F.R.C.S.Eng., for his assistance at the operation, and to Major Fielding, R.A.M.C., for administering chloroform.

Report.

REPORT ON THE EXAMINATION OF CONSCRIPTS FOR THE JAPANESE ARMY AND NAVY.

By Captain A. A. McNEIGHT.
Indian Medical Service.

Examination of Conscripts.

I attended the examination of conscripts held at the office of Kanda Ward, Tokio City, on the morning of May 23, 1913,

Kanda Ward forms part of the Azabu Ward R.R.D. (Recruiting District). The recruiting party of this district had already conducted examinations in the rural areas of their district, and for the next two months or so will continue them in the various wards of the city.

The examinations in Kanda Ward occupied from May 23 to May 29, and other wards take about the same time. As a general rule, the party has one day's rest after the examination of each ward or area is concluded, but, if this comes on a Friday or Saturday, the following Sunday is not observed as a holiday.

Personnel Engaged in Conducting the Examination.

The total personnel employed on the day on which I attended the examinations was as follows :—

The Commandant of the R.R.D. (a lieutenant-colonel of infantry); 3 medical officers (1 captain and 2 subalterns); 1 infantry N.C.O. (clerk to the commandant); 2 N.C.Os. of the medical service; 2 men of the military police; the chief of the ward; 4 officials of the Department of Education; 2 clerks of the ward office.

Routine of the Examination.

The sequence of the examination was, briefly, as follows :—

The men for examination, who had been ordered to attend in batches, at different hours, were collected in a waiting room under the supervision of the military policemen, each man carrying his conscription sheets. These sheets, two in number, are identical, and are ruled in columns with printed headings for the results of the different examinations, &c. The men passed, in turn, into a room occupied by the four officials of the Education Department, and were examined, each by one official, in reading, writing, and arithmetic. Each man was made to write his name, in the square hand, on a slip of paper, which was then attached to one of his conscription sheets. This plan of making the men write their names does not appear to be a very good test, as it seems to be the general rule, and each man has probably been taught how to write his own name, even if he can write nothing else. The men returned to the waiting room after this examination and were brought into the general examination room in batches of about twenty, as required. This room was a large hall, in which the rest of the examination was held. On a batch entering this hall they were taken possession of by a N.C.O. of the medical service, and made to sit down on mats on the floor. The N.C.O. explained to them the exact order in which the examination would be conducted, pointing out parts of the room which the men would have to visit in turn, and explaining particularly the details of the vision testing, illustrating how they were to describe the types that would be shown to them. After this the N.C.O. proceeded to take the weight, height and chest measurement of each man, calling out the results to a civilian clerk, who entered them on both conscription sheets. The men, who were barefooted, removed all their clothes, except a loincloth, putting them together in a large basket (of which there were two), until this part of the examination was over, when they dressed again, and passed on to wait in front of the N.C.O. responsible for the vision testing. This N.C.O. merely estimated the degree of vision. After this they passed in turn to :—

(*a*) A junior M.O., who carried out the colour vision test, examined the eyelids, and made a detailed examination in a dark room of any men whose degree of vision was below the required standard.

(*b*) A junior M.O., who examined the movements of the joints, the ears, mouth, nose, and head.

(*c*) The senior M.O., who took a general survey of the body, tested the man's intelligence, examined the chest, pudenda and anal region, and decided, on the results of his own and other examinations, into what class he should be put.

(*d*) The chief of the ward, who, by comparing the man's answers to questions with entries in a register, satisfied himself as to his identity, entered on the conscription sheets, from the register, the highest grade of school that he had passed, and filled in his register, from the conscription sheets, particulars as to his physique, &c.

(*e*) The Commandant of the R.R.D., who decided the arm of the service to which those passed as fit should be assigned, allotted the others to the second levy of the national army, rejected them altogether as unfit, or postponed them for a year, according to the results of the physical examination and other circumstances.

(*f*) The clerk of the Commandant of the R.R.D., who filed one of the conscription sheets; and

(*g*) A ward office clerk, who retained the other conscription sheet, and gave the man a slip of paper saying that he might go away, or that he must remain on the premises for the present.

Educational Examination.

This was conducted from printed books containing passages to be read and sums in arithmetic. There were three sets of books, each of a different standard.

Physical Examination.

(*a*) *General.*—In every place where the conscripts were required to stand for purposes of examination—*e.g.*, below the height standard, on the scales, the place where the chest measurement was taken, at the required distance from the test-types, and from the officer who tests the hearing, &c.—are either painted on a board or chalked on the floor the outline of two footmarks, on which the men were made to stand. Wherever they had to remove all their clothes, there were baskets to put them in.

(*b*) *Chest Measurement.*—Only one measurement was taken—the mean —unless one of the examining medical officers thought it necessary to estimate the range of expansion.

(*c*) *Vision Testing.*—A small portion of the room, beside a south window, was shut off by white screens, with the object of showing up the test-types.

The types used are said to be those decided on at an International Congress held within recent years. They ordinarily consist of Arabic numerals, and horseshoe figures the gap in the ring of which varies in position.

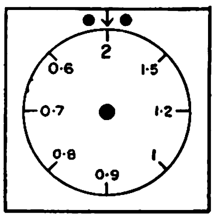
This year, for the first time, an apparatus designed by an officer of the Japanese Army Medical Service has been used, and in this district, at any rate, has been found highly satisfactory.

As I was unable to see the inside of the apparatus the following is only based on descriptions which I received.

The apparatus consists of a box, about 1 ft. square and 2½ in. thick, which is suspended vertically at a distance of 5 metres from where the conscript stands, and connected with this, by a string, is a dial which lies on the table in front of the person conducting the test.

Inside the box is a circular frame, which revolves round its centre. To this frame are attached eight circular cards. Each of these cards revolves on its own axis, and has painted on it a number of the test-type horseshoe figures, all of the same size. The sizes of the figures on the different cards are those of the different test-types. When a card is made to rotate, different shaped figures appear at the window in succession —the difference lying in the position of the gap in the circle.

By causing the frame carrying the cards to rotate the size of type that appears is altered; and by rotating one card on its axis the shape is changed. These rotations are produced by pulling or releasing the string which connects the test-type box with the dial, and which emerges from the bottom of the box.



The dial consists of a wooden stand about 8 in. square. Raised from this by about 1 in., and attached to its centre, is a revolving wooden disk, in the middle of which is a knob used as a handle. Near the edge of the disk are engraved the numbers of the test-types: 0·6, 0·7, 0·8, 0·9, 1·0, 1·2, 1·5, and 2·0 (of these 0·6 is the largest type, 2·0 the smallest). Between the disk and the stand is a spring which rotates the former, and a catch to prevent its rotation.

In the centre of one side of the stand are two buttons controlling the spring and catch, and an index line between them. The string from under the test-type box is wound round the lower part of the disk.

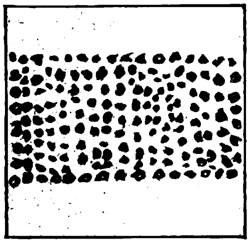
When the apparatus is first set up, the figure 2·0 is opposite the indicator, and the corresponding test-type appears in the window of the box. To make any sized type appear the handle is turned to the right

till the number of the type required is opposite the indicator. The catch under the disk stops it at the place required.

If one of the two buttons is pressed, the disk swings back to the first position (2·0 type). If the other button is pressed, the disk moves back one place—i.e., the next smaller type appears.

If it is desired to show several forms of, say, number 0·7 type, the dial is turned till that number is opposite the indicator, and then, to make the 0·7 card revolve at the window, the second button mentioned above is pressed (this sends the dial back towards No. 0·8), and the handle is again immediately turned to the right, back to No. 0·7. The movement really consists in a short turn or jerk to the left, followed by another jerk back to the former position; but the jerk to the left has to be carried out with the aid of the button.

Three forms of each size of type are exhibited to each eye. The standard required for men to pass as *ko* (first-class physique) is 0·7 for both eyes. Men whose vision with the right eye is not below 0·7, and left not below 0·4, are placed in *otsu* 1. Those who can read 0·6 but not 0·7 with the right eye are put in *otsu* 2; and those who cannot read 0·6 with the right are classed as unfit. Men who are otherwise fit, but whose sight is not up to the ordinary standard, may be taken for artillery or transport auxiliary soldiers (*yusotsu*).



The colour vision test is carried out by means of a book of plates, each plate consisting of a number of coloured dots on a white ground. The majority of the dots are of one colour, and among these two characters of the Japanese syllabary are shown in another colour. In the diagram Roman letters are given instead of the characters. The colours of the various plates are all different. Each man is shown three or four plates, and if he can read the characters on these is passed. The test seems more difficult than picking out coloured wools.

Trachoma.—Light cases of trachoma are passed as fit. "Medium" cases are put in class *otsu;* severe cases in class *tei* (unfit).

From a table showing the statistics for trachoma in the earlier examinations held in this district, it appeared that, out of a total of 858 men examined, 104, or 12·12 per cent, were found to suffer from trachoma,

and of these 10, or 1·16 per cent, of those examined were rejected as unfit on this account.

A neighbouring room was temporarily fitted up as a dark room for the ophthalmoscopic examination of men whose vision was below the standard.

Hearing Test.—The hearing test is carried out by the examining officer repeating in a whisper single words (names of places, &c.) at a distance of about 4 ft. from the examinee, who closes the ear not being tested with a moistened finger.

The ears are examined with an auroscope, and a forehead mirror is used in the inspection of the mouth, nose, and throat.

Flatfoot.—As, owing to the men moving about the room barefooted before coming to the senior inspecting medical officer, the soles of their feet get dirty, the presence of flatfoot is easily recognized. In doubtful cases they are made to wet their feet and pace the floor. Men are passed fit with what seems rather a marked degree of flatfoot. It is said that flatfoot is commonest among fishermen and boatmen, who work barefooted.

A small portion of the room was screened off for the examination of the pudenda, &c.

The number of cases of venereal disease among the 858 men referred to above was 32, or 3·73 per cent. The examination for hernia and for abnormalities of the spinal column appeared to be very superficial. I saw several men passed as fit without any physical examination of the chest having been made.

The regulations lay down that the senior medical officer must test carefully, with his nose, for the presence of an offensive odour in the axilla. This was not done at all at the examination which I attended.

Distribution of Men among the Different Arms.

The O.C., R.R.D. had in front of him a table showing the number of conscripts required from the Kanda Ward for each arm of the service and for the *Ersatz* Reserve. This is made out by dividing up the number required from the whole R.R.D. among the various wards, towns, villages, &c., in the district. This table also showed the average number required for each arm per day of the examination in the ward. In blank spaces in the table were filled in the number of men allotted to each arm as they were passed. In this way the C.O. was able to see, as the day went on, whether he was likely to get more men, or fewer, than he required, and to raise or lower the standard of height according to the supply of men passed fit.

The absolute minimum for infantry for Tokio City, this year, is said to be 5 ft. 1·2 in. The highest minimum standard that was reached in any area of this district before the party came into the city was

5 ft. 1·91 in. (The absolute minimum is fixed by higher authority, but the O.C., R.R.D. raises it in areas where the supply of taller men is sufficient to enable him to do so.) The tallest men, if otherwise of good physique, were allotted to the artillery.

It was stated that the highest standard of intellect is required for the cavalry and transport; and that men physically fit are never rejected on account of dullness of intellect, unless they are actually wanting.

A man is not allowed to join the same arm in which a brother of nearly the same age is serving, or has served in, lest, in the case of war, they should both be killed and possibly leave their family without means of support.

One blind man came up for examination. His weight and height were taken and he was passed on to the senior medical officer, who marked him "unfit." He was then seen by the head of the ward and by the commandant and allowed to leave.

The average number of men examined in one day, where there are three M.Os., is said to be between 140 and 170. Sometimes, however, over 200 are got through in a single day.

The whole of the examination which I attended was remarkable for its smooth working and for the absolute quiet maintained, although men were being examined in seven different parts of the room at the same time. The treatment of the examinees by the examiners was throughout considerate and patient—a point on which great stress is laid in the regulations.

Address to the Conscripts.

At 12 o'clock, when there was an hour's break in the day's examinations, the Commandant gave an address of about fifteen minutes' duration to those men who had been passed fit in the morning and those who were to be examined in the afternoon. He explained to them that conscription service is not only a duty, but also an honour and a privilege. He then outlined the growth of the Japanese Army and its history, enlarging on its successes in all wars in which the country has been hitherto engaged. These successes were due, he said, to the magnificent army formed of their predecessors, and it lay with them to see that the army of the future was even more magnificent and more successful. He finally told them of the necessity, and advantages to themselves, of their keeping in good health and working industriously at their trades, &c., in the interval remaining before they would have to join their regiments.

The address was delivered with great warmth, and was listened to with apparent interest and attention.

A similar address is delivered every day either by the Commandant or by one of the medical officers.

Echoes from the Past.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Dear Sir,—I am sending you a curious old report "on the Topography of Meerutt," which I hope you may think it worth your while to print as "an echo of the past." It is the work of Dr. Murray, Assistant Surgeon of the Meerut Division of Artillery, and deals with the period January 1, 1833, to June 1, 1837, that is, the period immediately antecedent to the accession of Queen Victoria, and twenty clear years before the outbreak of the Indian Mutiny.

I think you will agree that the report is an excellent one, and gives a vivid picture of the practice in the writer's hospital; at the same time it shows his professional acumen, and that in many points of treatment he was well ahead of his times.

His remarks on cholera are of extreme interest, especially those referring to the intravenous injection of strong saline solution, and the use of saline solution by frequent injections per rectum.

Lieutenant-Colonel Leonard Rogers, I.M.S., to whom I sent the pamphlet, writes:—

"It is certainly the earliest mention of both intravenous and rectal salines in cholera in India that I know of, being very little after Mackintosh and Lata of Edinburgh in 1831. . . . The cases in which he uses very strong salines by the rectum are interesting, as I have long thought that the hypertonic solution could be given that way with advantage, instead of the isotonic one, and I have hoped to find time to test if the excess of salts will be absorbed from the bowel, but have not done so yet. The remarks on dysentery and liver abscess are also interesting."

It is to be noted that Dr. Murray was alive to "the probable connection between ulceration of the colon and hepatic abscess," and recommends an early operation for the evacuation of liver abscess, a proceeding which was certainly not general when I came to India fifty years later.

The statistics given are of great interest, and Dr. Murray had reason to be proud of a mortality of only 24·2 per 1,000 of strength at that period, poorly as it contrasts with our present-day results. I have not the figures for India before me, but as late as 1869 the combined death-rate per 1,000 of strength of the Army at home and abroad was 19, so it must have been much higher in India. The figures as regards fevers—remittent 44 cases with 2 deaths, and intermittent 190 cases with 5 deaths—seem to make it evident that enteric fever, as we know it, was not prevalent.

The author does not appear to have distinguished between cerebral hæmorrhage and heat stroke, but calls them both "apoplexy."

A quaint touch is seen in the description of the hospital: "There are four wards for Europeans, the first is for the women and children—*or* for contagious diseases as small-pox" ! !

In the light of the modern extension of the plan of sending men to the hills in India instead of home and the consequent reduction of the invaliding returns, the remarks of Dr. Murray and Mr. Superintending Surgeon Playfair in this connexion are of interest.

I am, &c.,

Allahabad,
May 28, 1913.

ALAN E. TATE,
Colonel.

ON THE TOPOGRAPHY OF MEERUTT.

MEERUTT is one of the most ancient cities in India. It is situated in the centre of the Doab, nearly equi-distant from the Ganges and Jumna, and about 800 ft. above the level of the sea. It is a large crowded city, containing about 30,000 inhabitants, surrounded by a puckah wall,[1] 15 ft. in height. The cantonments are two miles north of the city. It is in Lat. 29° N. and Long. 77° 45′ E.

The surrounding country is, like all the Doab, extremely level. The soil is light, alluvial, and very productive, in most places retaining its verdure during the hot season, and during the rains clothed with luxuriant vegetation, and in many places covered with water. The roads are sandy and heavy, but freely passable, except during this latter period. At all seasons boats pass on the Ganges, between Calcutta and Gurmucteesah, which is thirty miles from Meerutt.

The river Ganges passes about twenty-five miles to the eastward. On the right bank, extending from Hurdwar to Gurmucteesah, (about sixty miles), varying in breadth, from half a mile to four miles, the land is low, marshy, and jungly, with high ground on the right. This tract is called the Cauder. It has been formed by various changes in the bed of the river. It abounds in tigers and game, and is a great source of attraction to the sporting gentlemen of the station, whose keenness often detains them till the hot season is far advanced, or even till the rains commence, and in consequence they frequently suffer from severe attacks of fever. Between the Cauder and Meerutt the soil is light, sandy, and

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[1] Built of burnt bricks and mortar.

alluvial, lying over a bed of kankur, from 1 to 20 ft. in depth. It is perfectly level, with few trees and little jungle; there are a few trees in the gardens of the officers in the station, but they do not prevent the free circulation of air.

The Kallah Nuddee passes about three miles to the east, one small branch passing through the station. Its banks are low and marshy. In the cold and hot seasons it is a small stream, and during the rains it is lost in the general inundation.

The Himalaya Mountains are distinctly visible in clear mornings, particularly after rain. They are about seventy miles distant to the north-east. The Sanitarium of Landour is 120 miles distant. It is accessible at all seasons of the year—the journey occupying thirty hours; dak travellers, who are detained at the Keree Pass, (the entrance to the valley of the Dhoon)—towards the end of the rainy season, are liable to attacks of severe remittent fever; though passing rapidly in the palkee does not often lead to any bad consequences; civilians and officers generally send their families to Mussooree, during the hot and rainy seasons, and then the children assume the florid ruddy appearance of the most healthy climates of Europe. The convalescent station of Simlah is about 200 miles distant—fifty hours dak to Bar, at the foot of the hills, and three easy marches, in the hills, to Simlah. It is accessible at all seasons, without danger.

Meerutt is considered one of the most healthy stations in India. The average mortality during the last four years has been $2\frac{1}{3}$ per cent amongst the Europeans, and $\frac{1}{3}$ per cent amongst the natives. The climate passes through great changes in temperature and humidity; but these are generally gradual and regular. The weather for five months, viz. from October to April, is delightfully cool and invigorating. The prevailing winds are westerly, and northerly, with little rain. In January the ground in the mornings is frequently covered with hoar-frost. Woollen clothing and fires are found necessary to comfort. In November and March, the direct rays of the sun are very powerful and ought to be avoided—this is the most healthy season of the year; the diseases are of an inflammatory nature, the fevers, though intermitting, yield to depletion and antimonial purgatives, and do not generally require quinine for their removal. Hepatic disease, with a strong tendency to abscess, is common during this period.

In April, the hot westerly wind commences; at first it begins in the afternoon, and ceases at sunset, afterwards in the morning, and continues during the greater part of the night. It crosses the

arid sandy desert of Ajmere, which may account for its being a dry wind. It ceases in June. During this season there are occasionally typhoons—strong gales, from the north-west, coming on suddenly, carrying before them clouds of dust and leaves, accompanied by lightning and thunder, frequently terminating in rain, and leaving the air very cool and refreshing. During this season the lightest clothes are necessary for comfort. Most houses and the barracks and hospitals are kept cool by means of tatties, whilst the circulation of air is kept up in the rooms by punkahs during the day, and occasionally during the night also. These expedients do not agree with all people, even when well, and I have seen decided bad effects from them, in diseases induced by checked perspiration. By means of tatties and punkahs, and keeping in the house during the day, this season passes not unpleasantly, especially as, though hot and relaxing, it is not generally unhealthy. Many, who have suffered severely from rheumatism, remittent fever, and spleen, enjoy better health than during any other period of the year. Fruit is abundant—as strawberries, loquats, peaches, apples, grapes, mangoes, &c. These, eaten in an unripe state, combined with imprudently sleeping behind tatties, or in the open air, are frequent causes of dysenteric complaints; inflammation, intermittent fevers, and acute hepatic attacks are also common from exposure to the sun. Convalescence is less rapid than during the cold season.

Towards the end of June the winds become variable, and the weather close and cloudy, with occasional showers in the intervals, between which it is extremely oppressive, hot and damp. The regular rainy season then sets in, and it rains with little intermission, and continues pretty cool, till the beginning of September; during this month it is cloudy with little wind, and occasionally extremely hot, and exhausting—this is the most unhealthy season of the year. Dysenteric attacks are frequent, and typhoid intermittent or remittent fevers very common, particularly amongst the grass-cutters, whose occupation exposes them to unhealthy alluvial exhalations. In October, though the days are very hot, the nights gradually become cool and pleasant—the changes of temperature are considerable, and they are much felt by those whose constitutions have been debilitated by the previous hot, and rainy seasons; dysentery, and remittent fever, of a more asthenic type than at the other seasons, are common; convalescence is slow during this season.

AVERAGE RANGE OF THERMOMETER FOR 1833-35.

Month	Sunrise Maximum	Sunrise Minimum	Noon Maximum	Noon Minimum	3 p.m. Maximum	3 p.m. Minimum	Number of rainy days
January	54	32	73	54	73	55	1
February	60	38	81	57	84	61	3
March	67	47	85	62	88	62	4
April	76	58	97	72	97	73	2
May	89	71	97	88	100	88	1
June	90	74	101	77	102	78	6
July	82	75	89	78	90	78	19
August	81	74	91	76	92	77	14
September	84	69	87	76	88	75	10
October	73	55	84	70	85	71	3
November	63	45	75	65	76	66	2
December	58	38	66	55	67	56	3

The climate is found to be favourable to many of the diseases induced by residence in other, more damp, parts of India. Europeans do not often suffer from a first attack of remittent fever, though returns of this disease occur during the latter part of the rains. The general character of the diseases is asthenic, and except in hepatic cases, not leaving great organic derangement. Great advantage is derived in accelerating convalescence, and regaining strength by removal to the convalescent station at Landour. The violent exercise and high excitement in this branch of the Service, viz. the Horse Artillery, in those who do not live more regularly or carefully than other European soldiers, induce a tendency to acute inflammatory disease. This, combined with the severe falls and blows occasionally received, may account for the frequency of hepatic disease tending to the formation of abscess.

The Hospital is a low puckah, flat-roofed, building, surrounded by a compound wall 9 ft. in height, situated 200 yards to the east of the barracks. It is surrounded by an enclosed verandah. It is hot, and wants an open verandah, in which the convalescents might walk, during the rains. It is freely ventilated, and the wards are kept as cool as possible, by tatties, during the hot weather; punkahs are used during the rains. There are four wards for Europeans, the first is for the women and children—or for contagious diseases as small-pox. The second is for the medical, and the third for the surgical cases of the Horse Artillery, the fourth is for the sick of the Company of Foot Artillery; they contain twelve to fourteen beds each, allowing, when full, above a thousand cubic feet for each patient. The average strength of the European Artillery is 404, but I have never seen the wards full. The floors are puckah, the beds cane-bottomed, 6 ft. by 3 ft., standing $1\frac{1}{2}$ ft. from the floor. No curtains are used, the mattresses are stuffed

with hemp, the sheets and dresses are made of cotton, the resai or coverlet is formed by sewing a piece of coloured cotton over a blanket; the whole is kept clean, and in good order. The Surgery occupies the north-east, and a covered walk leads from the south to the necessary.

The Native Hospital is of a similar structure; with one ward capable of containing fourteen beds. This is much too small, the average strength is 1,498; the verandahs are generally occupied by the sick, and more beds are put in the interior than there ought to be. The Hospital Serjeant lives in the other room.

The Dead House is at the south-west corner of the compound; the store-room and cook-room in the centre, with houses for the native servants in the south-east corner. There is an excellent puckah well near the cook-room; there is a good choppered thatched house containing three rooms and an enclosed verandah, over which an open verandah extends to the north of the Hospital for the Subordinate Medical Staff. A temporary building was erected in May, for the cases of yellow fever amongst the natives. The situation is low, and the compound is much under water during the rainy season, and at this period cases of remittent fever occasionally appear amongst the native patients and servants, and also in the families of the Subordinate Medical Staff; but on the whole the situation is healthy. A Lock Hospital is urgently required; the women in the bazar are carefully examined once a week, but as the sick are treated as out-patients they may, and frequently do, disseminate their diseases.

A Numerical Abstract of the Hospital Establishment attached to the Hospital of the Meerutt Division of Artillery.

European Hospital Establishment																							Native Hospital Establishment					
Medical Department								Steward's Department																				
Surgeon	Assistant Surgeon	Apothecary	Assistant Apothecary	Apprentice	Head Compounder	Head Dresser	Shop Coolees	Steward	Native Writer	Steward's Servants	Head Bheestee	Bheestees	Head Sweeper	Sweepers	Head Ward Coolee	Ward Coolees	Head Cook	Cooks	Tailors	Barber	Head Washerman	Washerman	Native Doctors	Shop Cooleeand Dresser	Bheestee	Sweeper	Bramin Cook	Goorgah
1	1	1	1	1	1	2	3	1	1	2	1	4	1	5	1	10	1	3	2	1	1	3	4	1	1	1	1	1

When in cantonments, two dhoolies are attached to the Brigade, for conveying the sick or wounded from the barracks or parade

to the hospital. When marching, during peace, five doolees per cent on the numerical strength, and during war 10 per cent, are allowed for that purpose. Should more carriage be required during the march, covered hackeries (carts) are procured, on indent on the nearest civil power.

The barracks are similar low flat-roofed puckah buildings, though longer and wider than the hospital. Those for the Horse Artillery run in three parallel lines to the west of the hospital, while that for the company of Foot Artillery is to the east. The verandahs are closed in, one occupied by the married people, and subdivided by mats; the other contains the messes; they are hot, and deficient in not having an open verandah, for exercise. They are calculated to contain seventy-six beds in the interior, besides the verandahs and end rooms; they are 274 ft. in length, 43 ft. in breadth, and 13 to 14 ft. in height; the verandahs are 8 ft. broad.

The beds and floors are analogous to those in the hospital, the cook-rooms and necessaries are to the south of their respective barracks. The stables of the European troops are in six parallel lines to the north, those of the native troops to the north-east.

There are three good puckah wells in the Horse Artillery, and two in the Foot Artillery, and native lines; the well water of the station, like that of the Doab generally, is earthy, and brackish, except in a few old puckah wells, generally dug by the Mahrattas. The water is from 8 to 15 ft. from the surface.

The situation of the barracks is very level, and much under water after heavy falls of rain; the drains are sufficient to carry off a moderate fall of rain, but not such as frequently falls during the rainy season.

The parade is a level plain, a mile in breadth, and extending about four miles; to the westward in front of the Buff, Lancer, and native lines, it is bounded by the low sandy hills; it is low and marshy towards the east, terminating in a large pool, called the Dhobee's Tank.

The Congee House is a low puckah building, situated to the north of the hospital; there are sixteen cells, each 10 ft. by 8 ft. The food of the prisoners is 1 lb. of bread per diem, with a jar of water, and a single quilt for furniture. When sick, they are removed to the hospital, and placed amongst the other patients; delirium tremens is often developed, after confinement, and rheumatism in the subacute form, called " the pains," sometimes afflicts the inmates.

The chief amusements of the men are long bowles, and fives; they have a very good library and theatre, both great sources of agreeable occupation.

The following is a list of a Horse Artilleryman's regimental necessaries :—

Blue jacket	1
Leather breeches	1
Warm overalls	1
Cloak...	1
Sash	1
Helmet	1
Long boots	1 pair
Spurs	1 ,,
Straps for overalls	1 ,,
Leather gloves	1 ,,
Jacket, white	6
Pantaloons, white	6
Shirts	6
Stockings	6 pairs
Flannel drawers	2 ,,
Flannel banyans	2
Short boots	2 pairs
Stable undress cap	1
Stock...	1

The white, warm weather clothing is worn from the 1st of April to the 1st November; very few wear flannel belts during the hot weather, though they would prove of the greatest advantage in preventing sudden changes of temperature on the surface of the body. I have never traced any bad effects from wearing flannel next the skin, and it is always recommended to those who have suffered from severe abdominal disease. The spirits consumed in the Canteen are rum and brandy, with wine and beer. Rum is the principal article in demand, the quality is good, and the price eight annas a bottle. The men are allowed to drink, in the Canteen, as much as they can pay for, so long as they are not drunk. This is allowing too much discretionary power, under unfavourable circumstances, to men not generally remarkable for abstinence, as a man may ruin his health by repeated or continued high excitement, though it do not proceed to intoxication. Within these last few years, beer brewed at this station by an enterprising individual, Mr. Bholee, has been much used. The draught beer

costs two annas, and the bottled eight annas per quart. The former is most generally used; but it is apt to get sour in the hot weather, before the cask is exhausted. It is in general used by the steady men, and there are very few cases of delirium tremens amongst its consumers.

An Abstract of the Hospital Reports of the Meerutt Division of Artillery, from the 1st of January, 1833, to the 1st of June, 1837.

Average Strength: Europeans .. .. 404; Natives 1,498

	Europeans Admitted	Europeans Died	Natives Admitted	Natives Died
Apoplexy	9	5	1	0
Asthma	0	0	3	1
Cutaneous diseases	2	0	0	0
Cholera	15	3	4	1
Diarrhœa	31	0	16	1
Dropsical affections	1	0	3	0
Dysentery	102	3	12	1
Dislocations and sprains	12	0	4	0
Delirium tremens	68	4	0	0
Fractures	19	0	15	0
Fevers—				
Remittent	44	2	20	4
Intermittent	190	5	229	11
Gonorrhœa	67	0	2	0
Hepatic affections—				
Acute	56	5	2	1
Chronic	9	2	0	0
Inflammations—				
External	24	0	0	0
Cephalic	1	0	0	0
Thoracic	2	0	0	0
Abdominal	1	0	0	0
Affections of urinary organs	6	0	2	0
Mania	1	0	0	0
Ophthalmic affections—				
Acute	36	0	18	0
Chronic	1	0	1	0
Phthisis pulmonalis	19	5	3	1
Rheumatism	51	1	34	3
Spleen	3	0	0	0
Syphilis—				
Primary	113	0	23	0
Secondary	2	0	0	0
Small-pox	15	1	9	0
Ulcers	78	0	90	0
Wounds and accidents	281	3	298	1
Other diseases	298	4	62	1
	1,557	43	851	26
Average mortality to sick	2·76	..	3·05	
,, to strength per annum	2·42	..	0·40	

Bazar spirits are not much used; they are commonly so acrid, that only desperately vitiated palates, and men wavering between excitement and horror (the precursors of delirium tremens) could swallow them. I believe it is impossible to prevent their being smuggled occasionally into barracks, or even into the hospital, though it has the advantage of a high wall, with a sentinel at the gate, and a guard in the interior. It is concealed in parcels, bladders, intestines, twisted round the body, and even in their boots. Improper food is sometimes conveyed to the patients; it is generally very easily detected, by the quantity, and nature of the evacuations, combined with some unfavourable change in the symptoms of the case. I punish the consumer, at the same time explaining the injustice to the medical treatment, the loss to the service, and the chance of ruining their constitutions, and losing the service without a pension, independent of the immediate prospect of a court martial. When once detected they seldom repeat the offence.

(To be continued.)

Reviews.

THE PATHOLOGY OF GROWTH. Tumours. By Charles Powell White, M.D., F.R.C.S. London: Constable and Co. Ltd., 1913. Pp. xii and 235. Price 10s. 6d. net.

This admirable work should be of the greatest service to students and medical men anxious to get a clear notion of the problems connected with tumours, both benign and malignant. The literary form is so much better than that of most medical publications that we cannot resist our impulse to praise what perhaps ought to be taken for granted. Literary form in scientific work makes a much higher demand than mere elegance. It implies a lucidity and accuracy of thought underlying a lucidity and accuracy of expression. The merit of this book lies in clear thinking combined with concise and systematic treatment of a subject that has suffered much at the hands of its exponents. In the author's view, the essential factor in tumour formation is an intrinsic one, an unstable condition of the physiological equilibrium of the tissues or cells of the body. Owing to the want of those influences that normally regulate the relative position and amount of the component parts of the body, any disturbance may be followed by continued growth where such a condition of instability exists. Thus extrinsic causes, such as chronic irritation, acting under favourable conditions, are frequently able to determine the growth of tumours. We gather, too, that extrinsic causes may actually bring about "an unstable condition of physiological equilibrium," as in

the case of Kangri cancer, where repeated burning of the skin of the abdomen and thighs by a charcoal stove carried for warmth in a basket—the Kangri—by the inhabitants of Kashmir leads to abnormal proliferation of the epithelium and the formation of a carcinoma, the chronic burning being here not merely a determining but an actual cause of the tumour. While opposed to the theory that cancer is caused by a parasite invading the body from outside, the author admits that a tumour, malignant or otherwise, might correctly be regarded as an autochthonous parasite. In dealing with the relation of the tumour to the organism he says: "We may therefore consider cancer as a disease due to infection by cancer cells in the same way as we consider tuberculosis as a disease due to infection by tubercle bacilli. The cancer cells are, however, directly descended from the body cells of the infected animal, while the tubercle bacilli are foreign organisms altogether." In histiomata, the growth of parenchyma and stroma are co-ordinated *inter se* but are not co-ordinated with the growth of surrounding structures. A histioma can thus be considered as a multicellular individual dependent on its surroundings for its nutriment only. It thus resembles a metazoal parasite. In a cystoma the cells have become free from the control of the organism and behave as independent units, so that a cystoma is not an individual but a colony of individual cells, each of which may be compared to a protozoal parasite. The volume is of a convenient size, the print is good, the photomicrographs admirably illustrate the text, and the book is increased in value by a glossary in the form of an appendix. We have nothing but praise for this work, the reading of which has greatly interested us. S. L. C.

Epidemic Infantile Paralysis. By Professor Paul H. Römer. Translated by H. Ridley Prentice. London: John Bale, Sons and Danielsson, 1913. Pp. xi and 208. Price 7s. 6d. net.

Epidemic infantile paralysis has acquired a considerable access of importance of late years, not only on account of the occurrence of frequent epidemics, but also on account of the fruitful researches which have been made into its causation by Flexner, Lewis, Römer, and others; for these reasons the present monograph will be welcomed as giving an excellent résumé of the present state of our knowledge on the subject. The book commences with the history of the disease, then follows a very excellent account of the clinical phenomena; the great variability of the symptoms is brought out prominently, they vary from a transient fever with no paralysis to an acute ascending paralysis of the Landry type with fatal result. Some cases are spinal, some cerebral, some with both spinal and cerebral symptoms. The clinical picture is followed by a record of experiments by the author, which agree with those of Flexner and Lewis, and which go to show that the disease is infectious and is due to an ultramicroscopic filtrable virus. The virus behaves like that of rabies and can be kept in glycerine (33 per cent) at 4° C. for as long as ninety-five days. Römer has kept it in pure glycerine for one hundred and forty-two days; it can also be dried over caustic potash for at least twenty-four days without losing virulence. Most experiments go to show that animals other than monkeys are immune. The virus has been found in man in the affected tissues of the central nervous system and in the

mesenteric glands; in experimentally infected monkeys it has been found in these situations and in the mucous membrane of the nose though never in the mucus; when injected it apparently travels by the lymphatics and, apart from the central nervous system, shows a special affinity for lymphatic gland tissue.

With regard to methods of infection, apart from purely laboratory methods of infection, the only successful results have been through the mucous membrane of the nose, after using some violence to its integrity, and by feeding.

It is suggested on account of the presence of throat, respiratory and intestinal symptoms in the prodromal stages of the disease that infection occurs by these routes, but hitherto no proof has been adduced for this theory.

The author describes numerous epidemics which have occurred in various countries, and gives the evidence which goes to show that the disease is contagious from man to man. Successful immunization experiments on the lines of those employed in rabies are quoted, the serum of recovered cases contains specific antibodies which render the virus innocuous for monkeys, but attempts at securing a curative serum have, so far, been fruitless. The only drug that seems to offer prospects of usefulness is urotropine, as in cerebro-spinal meningitis.

The book has a large bibliography appended, it gives a very clear description of the present condition of our knowledge on the subject, and will be of great value to workers and to others who have to treat the disease. W. S. H.

PROPHYLACTIC INOCULATION AGAINST CHOLERA. By W. M. Haffkine. Calcutta: Thacker, Spink and Co., 1913. Pp. 98. Price Rs. 3.

In this book Dr. Haffkine gives an account of his researches which led to the preparation of anti-cholera vaccine. In the first part of his work he discusses the relation between the virulence of a germ and its immunizing properties; the conclusion in brief is that the antigenetic power of a germ varies with its virulence. This is not in accord with our experiences with *Bacillus typhosus.* Originally Haffkine used a non-virulent strain of cholera for a first injection so as to avoid sloughing of the skin; he found, however, that sloughing did not occur in the human subject even when a virulent cholera culture was injected. Now he only uses the virulent culture (vaccine 2). The author gives numerous statistics; from these we take the following collected on the Cachar tea estates: Among 6,549 uninoculated coolies there were 198 cases (3·02 per cent), and 124 deaths (1·89 per cent); among 5,778 inoculated coolies there were 27 cases (0·47 per cent), and 14 deaths (0·24 per cent).

The writer also gives some account of the laboratory results from use of a devitalized vaccine, but so far this method has not been put to the practical test. W. S. H.

HOW TO DIAGNOSE SMALLPOX. By W. McC. Wanklyn. London: Smith, Elder and Co., 1913. Pp. vii and 104. Price 3s. 6d. net.

This small volume is intended as a guide to general practitioners, post-graduate students and others. Smallpox nowadays has become so rare in this country that men may pass through a long career without ever

seeing a case; small wonder then that, with such a protean disease as it may be in its early stages, mistakes are made; and such mistakes are peculiarly disastrous because of the intense infectivity of the disease. For these reasons a guide by one of such large experience as Dr. Wanklyn, is welcome and necessary. A perusal of the volume will serve to shake the confidence of many in their powers of recognizing small-pox. The classical features of the rash may be absent in the early stages of difficult cases, and it is in these that mistakes occur. Dr. Wanklyn attaches great importance to the distribution of the rash, he considers this first, then deals with the character of the rash in detail; and lastly, goes into the history—an almost exact reversal of the usual procedure. A perusal of the book would be profitable to most of us, and might save us from a humiliating mistake later on. W. S. H.

INCIPIENT PULMONARY TUBERCULOSIS. By D. B. Lees. London: H. K. Lewis, 1913. Pp. 116. Price 5s. net.

This is a reprint of Dr. Lees's Bradshaw Lecture for 1912, together with abstracts of other lectures bearing on the same subject. Dr. Lees begins by insisting on the necessity for early diagnosis, and maintains that this can be made out by percussion over certain definite areas before any other physical signs are present. In percussion he insists on the patient being recumbent and completely relaxed, he also recommends the periodic examination of the sizes of the dull areas as a means of prognosis; he lays claim to a very extraordinary accuracy in this procedure, and maintains that with practice it is possible to gauge the size of a dull area to within $\frac{1}{6}$ or $\frac{1}{8}$ of a finger's breadth, i.e., $\frac{1}{9}$ to $\frac{1}{12}$ of an inch! This seems to be asking a good deal even from one blessed with the most acutely sensitive musical ear. For treatment he recommends continuous inhalation of a mixture of

Creasote	ʒii
Carbolic acid	ʒii
Tinct. iodi	ʒi
Spt. etheris	ʒi
Spt. chloroformi	ʒii

The first three are antiseptic, the alcohol and ether are stimulating and the chloroform sedative, the antiseptics must necessarily reach the bacilli, and everyone knows that antiseptics kill bacteria; there are gaps in the argument! A list of cases is given, showing forty-eight complete recoveries, three probably complete recoveries and seven deaths, out of seventy cases. We note that in ten of these cases tubercle bacilli were found in the sputum, but only in nineteen cases does the sputum appear to have been submitted to bacteriological examination. The results would have been more convincing if more evidence had been given as to the actual presence of phthisis in the cases which are tabulated.

The antiseptic inhalation treatment of phthisis has numerous advocates, and this book will be useful to those who wish to try the method.

W. S. H.

ORTHOPÆDICS IN MEDICAL PRACTICE. By Lorenz and Saxl. London: John Bale, Sons and Danielsson, 1913. Pp. xvi and 288. Price 7s. 6d. net.

This book, which has been translated by Dr. Peel Ritchie, deals with such parts of orthopædics as are of special interest to the general

practitioner. It commences with a discussion as to the action of deformities of the spine and thorax on the heart, lungs and other viscera. The authors draw attention to the fact that belly ache in a child even when it is definitely associated with feeding may be due to tubercular spondylitis, they also emphasize the danger of overlooking spondylitis in cases of neuralgic pains in various regions, arms, legs, &c. They associate certain cases of static albuminuria with lordosis and say that in such cases the albuminuria disappears when the lordosis is corrected. Among other useful hints which are to be found in the book are such things as the significance of pain on the outer side of the thigh (neuralgia) in cases of developing flat foot.

The portion of the book which will probably appeal most to general practitioners is that dealing with cases of anterior poliomyelitis; such cases often tax all one's ingenuity to devise arrangements which will enable the patient to take some part at any rate in the life of the world.

A note on typhoid spondylitis is of interest; for this condition the writers recommend fixation on a plaster-bed followed later by the use of a fixing corset for several months. The subjects dealt with in the book are inadequately treated in the ordinary textbooks; they are, however, of sufficient importance to demand a more than bowing acquaintance on the part of the general practitioner, and for this reason the volume will find an appropriate place in one's library. W. S. H.

Practical Physiological Chemistry. By Sidney W. Cole, M.A. Third Edition. Cambridge: W. Heffer and Sons, Ltd. Pp. xi and 223. Price 7s. 6d.

The present volume is the third edition of the author's well-known practical exercises in physiological chemistry, under a new name. The author is to be congratulated on improving what was always a sound and practical treatise on the subject. The microchemical methods of urinary analysis introduced by Folin have not received among teachers the attention they deserve, and it is satisfactory to observe that the author considers them reliable and easily carried out; he advocates their more general use. The whole of the exercises are put so clearly and are so well explained by additional notes, that the student or others interested can have no difficulty, with perseverance and the book before him, in thoroughly mastering what is often looked upon as a difficult subject. There are excellent descriptions of the method of using such instruments as the spectroscope, Beckmann's freezing point apparatus and thermometer, and Dubosq's calorimeter, accompanied by clear diagrammatic figures, which greatly enhance the value of the work. Bang's method for the quantitative estimation of sugar is considered by the author to be undoubtedly the most accurate. This has been our experience at the Royal Army Medical College, and it is surprising that it has not been more extensively used in other schools.

The last chapter of the book is devoted to some very useful tables for the detection of substances of physiological interest, and at the end spaces are provided on which the student can draw various crystalline forms from preparations made by himself; there is also a blank chart for recording the absorption spectra of various pigment solutions and colour reactions.

W. W. O. B.

IONIC MEDICATION. By H. Lewis Jones, M.D., F.R.C.P. London: H. K. Lewis, 1913. Pp. viii and 151. Price 5s.

This is an account of the principles of ionic medication, its technique and the clinical results obtained by it. As might be expected from an author who is thoroughly master of his subject, the teaching is clear and easily understood even by those who have little knowledge of electricity.

Those who have employed ionic medication know how useful it is, when properly applied, in the treatment of chronic inflammatory conditions, ulcers, various forms of arthritis and numerous other ailments which are often the despair of the physician or surgeon, and this book will serve a good purpose by extending the use of this valuable treatment. It deserves a wide circulation. L. W. H.

1870-71, ERINNERUNGEN UND BETRACHTUNGEN (Memories of 1870-71). By Prof. Dr. Heinrich Fritsch, Geh.-Obermedizinalrat. Bonn: A. Marcus and E. Weber, 1913. Pp. 314. Price 5 Mark.

This book contains the reminiscences of a young German surgeon who as a regimental medical officer accompanied the German armies into France. Just qualified, the author volunteered for the front and was attached to an infantry battalion. He accompanied his regiment to Metz, and then after a short interval took part in the campaign in the south of France against Garibaldi. The book is full of vivid description. There is no writing for effect, but a simple recital of things as they were. And it is in this that the value of the book lies.

A famous general stated in his reminiscences that in a celebrated battle he found a long queue of men standing one behind another, with the foremost behind a small tree. They were sheltering from the enemy's fire! The author tells a similar story. In the middle of an engagement he heard groans proceeding apparently from under his feet, and finally discovered a dry water channel under the road simply packed with men, not wounded only, but unwounded also. He ejected the hale ones only to have others pressing in on him immediately. "The sound ones trod on the shattered limbs of the wounded ones. Here a man was weeping, there another yelling, there some one asked for water, another filled the air with curses. Some incessantly waved white handkerchiefs at the mouth of the tunnel, because they thought the French were already there." A little further on we read that: "A soldier had placed the butt of his rifle against his thigh, loaded it and fired straight up into the air. His major caught hold of the rifle and shouted at him 'stop firing.' 'Yes, sir,' said the man, and immediately mechanically put another cartridge in his rifle and blazed away into the sky. He did not in the least know what he was doing." It is only just to add that the regiment had suffered fearfully. It went into action three battalions strong with fifty to sixty officers. It came out with one field officer who commanded the whole, three captains who commanded a battalion each, and twelve company officers who were all second lieutenants, and of whom four belonged to the Reserve. Elsewhere we get a description of groping with loaded stretchers in the darkness through a wood, of tired bearers with no one to relieve them, for though there was a small crowd of unwounded men with them they themselves were too tired to have any sympathy left; they simply wanted rest. Then the arrival at a "dressing station" where there was

nothing, no doctors, no beds, simply the bare floors of a house with the wounded lying on them packed like herrings and overflowing into the yard. Then this personal touch: the author worn out by eighteen hours' work lying down among his wounded in the yard, a wounded horse *in extremis* next him kicking, a neighbour kindly warning him that he might be kicked to death and the author too tired to stir. Then in the morning the burying: a peasant as undertaker with a big cart horse, tying a rope to the leg of a corpse, and then away with it over roads and fields and ditches to the nearest grave trench. Almost Zolaesque these silhouettes. I will close the description of these battle scenes by the advice an old war-worn surgeon-major gave to the author who had lost touch with his regiment by staying behind to look after wounded: "You are doing wrong. Our functions in battle are purely decorative. Every soldier is to see: there is the man who will look after him if he is hit. But if you really attempted to apply proper dressings it would take too much time and you could not in any case do any good for want of the proper appliances. The first thing the next doctor who sees the man will do is always to take off the dressing and throw it away, be it well or badly applied. You will lose touch with your battalion which is now advancing, now retreating. If you thus get lost and the battalion does not see you, everybody will accuse you of funking, and you will lose your good name. Always remain with your battalion. Wounded men must simply be taken to the rear as soon as possible."

After the fights near Metz the author was stationed awhile in Saarlouis on the lines of communication. It contained several improvised hospitals; among these one was established in some new barracks in which, however, no sanitary arrangements had yet been put. For slight cases and orderlies there was a latrine in the yard, for the worst cases there were bed-pans, for intermediate ones there was a heap of sand in the corridor which was cleared away once daily. The "hospital" was equipped for 100 beds, the cases were often half or a quarter as many again, ten to twenty men often dropping in casually in the night from some field unit. When the author took over, typhoid and dysentery cases lay indiscriminately among wounded men. There were no case-sheets, in most cases no diagnoses. Besides him there were in the town an old surgeon-major whose whole time was taken up with returns, and a totally deaf retired medical officer who had been re-employed. Then there were periodical invasions of Berlin consultants full of theories, and full of horror at what they saw, and charitable ladies who wanted "to nurse" the poor soldiers, but would not do any real work. There was also a battalion not far off under the charge of an unqualified medical student who had not even passed his first professional, and knew nothing about drugs. His method of prescribing deserves mention. If he desired to give a drug he first tried the effect of a teaspoonful of it on a dog. If the dog survived then the patient got it in minim doses. Some of his most successful cures had been due to the internal administration of an insecticide. His method of filling in his returns was also original. He divided his sick fairly equally among the various diseases enumerated on the official form, of course avoiding such obvious absurdities as "sunstroke" in cold and wet weather. Only once did he get caught out. He had inadvertently put down five cases opposite the name of an infectious disease, and

immediately a special report on the "epidemic" was asked for. However, this did not defeat the gentleman in question. He quietly wrote in to headquarters that a regrettable clerical error had occurred and that the figure 5 should by rights have been opposite the heading "other external and internal diseases." The incident was at an end.

There is thus withal a rich element of humour in the book. There is the story how the author got into trouble with his official superiors which ended by the Surgeon-General sending him a severe reprimand with the final endorsement beloved by headquarter officers: "To be returned"; of how he then took counsel of a worldly wise major who said: "Don't you be such a fool as to return it. If you do, they will file it among your records of service and it will always go against you. Put it in your pocket and stick to it, and if you get any reminders treat them in the same way. Letters have a wonderful way of going astray on service and they will soon get tired of writing to you"; and of how he followed this advice with apparently perfect success. Then there are stories of his equestrian troubles; of his faithful servant, who, when his master was sick and trying to sleep would wake him up every half hour by tender inquiries as to whether he felt better. The book finishes with an account of the author's farewell to one of the old colour-serjeants. The war was over, demobilization was complete, and the author was returning to civil life. He walked across the barrack square to say good-bye to the colour-serjeant of the company to which he had been attached, when he heard that worthy haranguing the remnants of his command as follows: "You men seem to think you can carry on with the slack ways you got into during the war. You don't know what you are here for. That nonsense with the war is finished and you have got to take life seriously now. I'll teach you what soldiering is. The war has been the ruin of you damned scoundrels, you have lost all sense of discipline and order," &c., &c. How typical, as the author himself says, of the good old "backbone of the army," to whom war was a side issue and smartness on parade the main thing.

J. A. B.

Current Literature.

Report to the Local Government Board on Bacterial Food Poisoning and Food Infections, by W. W. G. Savage.—In this very important report Savage states that the early conceptions of food poisoning were purely chemical in nature, and this without invoking bacterial action upon the meat to produce the chemical poisons. Ptomaines, bodies highly toxic to animals and obtained from putrefying meat, were at a later period supposed to be the cause of most cases of food poisoning. In 1876 Bollinger pointed out that many outbreaks of food poisoning were associated with pyæmic and septicæmic conditions of the animals from which the food was obtained. The bacteriological proof of this relationship was not forthcoming until in 1888 Gaertner isolated the *Bacillus enteritidis* from a meat poisoning outbreak at Frankenhausen. Since that date this bacillus, or closely allied forms, has been isolated from a large number of outbreaks both in this country and abroad. For convenience the bacteria concerned in food poisoning are classified in three groups: (*a*) The Gaertner group of bacilli; (*b*) non-Gaertner aerobic bacilli, such as *B. proteus* and *B. coli;* (*c*) *B. botulinus.*

Out of thirty-two outbreaks of food poisoning in England which were bacteriologically examined the Gaertner group of bacilli was shown to be the cause in twenty-five instances, a percentage of 78. In every one of the forty-four Continental outbreaks the Gaertner group was isolated. As regards *B. coli* Savage states there is no clear evidence connecting ætiologically *B. coli* with outbreaks of food poisoning, although it is not possible to exclude it as a potential cause. From a summary of outbreaks supposed to be due to *B. proteus* he arrives at the conclusion that the available evidence is insufficient to prove that this organism is ever a cause of extensive outbreaks of food poisoning.

The *B. botulinus* was isolated in 1895 by Van Ermengem from a ham the consumption of which caused an outbreak of botulism at Ellezelles (Belgium). Botulism differs from ordinary food poisoning in that the symptoms are chiefly referable to the central nervous system. The *B. botulinus* is a large anaerobic spore-bearing bacillus, and produces toxins which are readily destroyed at 80° C. In none of the outbreaks have any of the foods been eaten in a fresh state, the toxic properties only developing after the food has been stored. The infected foods have usually been eaten in a raw condition, and Van Ermengem says that botulism is never caused when the food is properly cooked. He also recommends that in salting food, the brine should contain 15 per cent of sodium chloride as the *B. botulinus* will not develop in media containing more than 6 per cent of sodium chloride.

Having shown that the majority of recorded outbreaks of food poisoning are caused by bacteria of the Gaertner group, Savage then proceeds to show that these bacilli must be distinguished by serological and cultural tests from the pseudo-Gaertner bacilli which are not uncommon in the healthy animal and human intestines, but are not a cause of either human or animal disease. He divides the Gaertner group into two sub-groups:

(*a*) The true Gaertner bacilli, and (*b*) the Para-Gaertner bacilli (or pseudo-Gaertner bacilli). The true Gaertner bacilli are culturally indistinguishable, but can be differentiated by means of agglutination and other serological tests into several organisms. True Gaertner bacilli are rarely found in the intestines of healthy human beings. They are also very rarely detected in the intestines of animals likely to be used for food, and are usually absent from prepared meat foods.

They may, however, be met with in the intestinal contents of rats and mice showing no signs of disease. These animals also suffer from epidemics of disease due to true Gaertner bacilli. Some observers consider that these facts warrant the belief that the Gaertner bacilli are natural intestinal inhabitants of rats and mice; but Savage thinks that the bacilli are present in the internal organs and not in the intestines, the animals acting as "carriers."

After considering the sources and methods of infection in food-poisoning outbreaks Savage arrives at the conclusion that they "are due to the infection of the food with virulent Gaertner group organisms (or other special bacilli) derived from animals which are either at the time suffering from disease due to Gaertner group bacilli or acting as carriers of these bacilli."

From the preventive point of view food-poisoning cases must be looked upon as forming two groups: (*a*) Those due to the consumption of meat derived from diseased animals: an *intra-vitam* infection with food-poisoning bacilli, in most cases members of the Gaertner group, but probably occasionally with other varieties of bacteria; (*b*) those due to the contamination of healthy meat or other food with food-poisoning bacilli derived from other causes than the food itself.

The second group is probably larger than the first.

Under the system of isolated slaughter-houses in vogue in this country it is impossible to exert any adequate supervision on the slaughter of animals for food, and it is easy for diseased animals to be put on the market and sold as healthy. Even if slaughter were confined to public abattoirs it is plain that a bacteriological examination of the meat could not possibly be applied to routine work. Separation of the slaughter-house from the places where food is prepared is a practicable and most important measure. Strict cleanliness of these places should also be enforced. Limitation of the amount of Gaertner disease in animals would be difficult to secure. But it is for consideration whether it would not be advisable to limit the distribution of bacilli of the Gaertner group in the form of the various rat and mice viruses. W. H. H.

Local Government Board—Report on Venereal Diseases by Dr. R. W. Johnstone. — About a year ago the President of the Local Government Board gave instructions for an inquiry to be made into the existing control over venereal diseases, with special reference to the adequacy and general character of the arrangements for institutional treatment of these diseases now available in England and Wales.

Dr. Johnstone begins his report with a brief but interesting summary of our present knowledge of these diseases. In this account he acknowledges the good work done at the Military Hospital, Rochester Row.

Dr. Arthur Newsholme, in summing up Dr. Johnstone's report,

remarks that the serious extent to which syphilis affects the national health is not generally realized; also that the amount and character of the institutional treatment available in England and Wales for syphilis is unsatisfactory. To combat the spread of venereal diseases, he recommends that means for early and accurate diagnosis, together with skilled advice and adequate treatment, should be provided for all infected persons by subsidizing accommodation in general hospitals, rather than by the erection of special hospitals. He thinks that compulsory notification would lead to concealment of the disease, and does not recommend its adoption. C. E. P.

Sublimate and other Chemically Treated Dressings.—In *Veröffentlichungen aus dem Gebiete des Militär-Sanitätswesens*, Heft 54, 1913, is a report on the sterilization of bandages and dressings by means of mercuric chloride and other chemical agents; 0·3 per cent of corrosive sublimate must be present in gauze in order to kill pus organisms suspended in serum. Now on storing sublimate bandages and dressings for a year or more there is great loss of the mercuric salt. Material which originally contained 0·45 per cent corrosive sublimate was found at the end of a year to yield 0·3 per cent only. Mercuric cyanide is somewhat more stable, but it is a weaker germicide than the chloride. Of the many substitutes tested, none was found as effective as these salts.

The bandages and dressings supplied to the German Army are sterilized by heat alone. Chemical disinfection has been discontinued.

C. B.

The Importance of the Medical Services in War.—The following extracts have been taken from Mr. Frank Fox's lecture at the Royal United Service Institution, "Observations of a War Correspondent with the Bulgarian Army," published in the *Journal* of the Institution, June, 1913:—

Speaking of the plans which the Bulgarians had made for the disposal of the Turkish territory in Europe after its conquest, Mr. Fox said:—

"It needed great confidence and exact knowledge as to the position of the Turkish Army to allow plans of that sort to have been not only formed, but to be generally talked about. At the outset of the war the Bulgarian people thought that programme would be carried through; and, personally, I think that, if their medical service had not broken down so utterly, they might have got through to Constantinople.

"To emphasize this point I will digress to say that after the Battle of Chatalja, on the second night of the battle, Colonel Jostoff came to us and told us we need not get our horses ready for to-morrow, as there would be no more fighting. And he gave as the reason that the cholera —not the real Asiatic cholera, but a kind of choleraic dysentery which had raged in the Turkish Army—had passed into the Bulgarian lines. He said that for every man who was wounded that day, ten had come to the hospital saying, 'I am ill.' The wounded on that day must have been 3,000, and that meant 30,000 cases of sickness, causing a very grave deterioration of the courage of the Bulgarian Army. The soldiers stood wounds with wonderful patience and virtue, but when smitten with this

disease the poor fellows howled out in their agony; and the effect of that on their comrades was terrible. If that cholera had not broken out in the Bulgarian camp, I think it is just possible that the Bulgarian Army would have broken through the lines of Chatalja. They had done a little of the work when the battle ceased, and it was possible they would have completed the work, as they had done almost as great things before. And if the Bulgarian medical service had been as good as other branches of their service, I do not think that cholera would have broken out in their lines. In that one respect the Bulgarian Army was not prepared; it was the one thing in which they had not been trained; it was the department in which the war broke down in the final outcome. Their successful invasion of Turkey broke down owing practically to the entire absence of ordinary sanitary precautions."

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Again referring to the medical service, Mr. Fox said:—

"Now about the Bulgarian medical service. I think that is a point of interest to the British Army, because, since the Japanese War, there has been much thought given to the perfection of the sanitary and medical services. If you want me to tell you what I consider are the lessons of the Bulgarian medical and sanitary services, I must say frankly that those services did not exist. But we can learn the lessons of the shocking consequences of neglecting that part of the organization. There was not at any stage of the campaign up to the Battle of Chatalja — that is, until after the outbreak of cholera — any precaution, to my knowledge, taken to secure a clean water supply, or clean camping grounds, or to take the most elementary precautions against the outbreak of disease in the Army. The medical service was almost as bad. I saw much of the hospital work at Kirk Kilisse after the armistice, and it was deplorable to see the fine fellows whose lives were sacrificed, or whose limbs were sacrificed through neglect of medical knowledge. I am sure the Bulgarians would have saved many hundreds of lives if there had been anything like a proper medical service at the front.

"After Chatalja, a very great movement for reform was instituted, and I think the medical condition of the Bulgarian Army now is a great deal better than it was at the outbreak of the war; and it will probably be very much better in the next war, in regard to the precautions against disease. But the Bulgarian campaign undoubtedly broke down, partly because of the bad medical service, and of the complete absence of sanitary precautions. The natural health of the troops was excellent. The Bulgarian peasant, with his simple diet and completely virtuous life, was a good subject. In the hospitals I saw no cases of illness arising from vice. The Bulgarian lives a very simple life on a very simple diet, and so he was naturally an extraordinarily healthy man. The way in which wounds healed, if they had anything like a chance, was wonderful; but, as I have said, the mortality from wounds was much greater than it should have been."

The Medical Department of the United States Army in the Civil War. Pope's Virginia Campaign.—Captain Louis C. Duncan, Medical

Corps, U.S. Army, has contributed to the *Military Surgeon* a series of most interesting articles on the medical arrangements of the principal battles of the Civil War. The following extracts are from his description of the Battle of Bull Run (*The Military Surgeon*, January, 1913), to show the extremities to which the medical service was then reduced, owing to its state of unpreparedness :—

"The number of men wounded at this battle was reported to be 8,452. Many wounded had found their way to Centreville; all the buildings in the town and along the road were full of them."

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"In the later editions of the Washington papers of Saturday this notice appeared :—

"'SURGEONS AND NURSES WANTED.

"'There is pressing need for the services of surgeons and nurses (male) to attend to the wounded of the great battles that have taken place recently. We are requested by the War Department to call for such volunteers from this point to repair at once to Alexandria, prepared to stay near the scene of action for some days at least. On reaching Alexandria they will find at the railroad depot provision made for their prompt transmission to points where their services may be needed.'

"This notice was given out by the Secretary of War, but probably on request of the Surgeon-General.

"There was a general response to the call, and about a thousand clerks and other civilians were at Alexandria for the train that evening. They were packed in box cars, and the train did not leave until nine. Then the engine was weak and had to take the train up every grade by sections, so that Fairfax was not reached until six on Sunday morning. When this motley crew (Haupt reported that many were drunk) reached Fairfax they found that no provision had been made for transporting them to the field, twelve to fifteen miles away. Some started forward on foot, but were stopped by the guard. They telegraphed to Washington, asking what to do, and were advised to return, which they did. A few stayed and soon had plenty of work, for that day the wounded were removed from Bull Run to Fairfax, where some of the volunteers rendered real aid.

"This party should at least have been placed in charge of a reliable officer, with passes and transportation from Fairfax."

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"The Surgeon-General's force was working until midnight on Saturday getting another force of surgeons, with wagons and vehicles for bringing in the wounded.

"As all available ambulances had already been sent out, the Surgeon-General called on the Provost Marshal to gather up vehicles wherever he could find them on the streets. Monday's *Star* described this action as follows :—

"'Saturday night the military authorities commenced to impress all the public hacks, wagons, &c., into service, to be used under the direction of the medical director, in moving the wounded to the hospitals, and

yesterday large numbers of them were in service near Centreville bringing in the sick and wounded. Many of the drivers, when night came on, came back to the city, and this morning, with others who had escaped being impressed previously, made their appearance on their stands on the avenue. As soon, however, as one made its appearance, a soldier took possession of the vehicle, drivers and all, and escorted them to the medical director's office, where their numbers and the names of the drivers were taken, and they were organized into trains. This morning all the omnibuses (the old Georgetown line and the present Navy Yard line) were taken possession of, and are now employed in the service of the Government. The Western Market was the scene of some fun when the seizure was made there Saturday night, the first intimation the butchers and hucksters had of it being a strong guard who surrounded the market house, and then made the wishes of Uncle Samuel known. Some with a good grace acceded to the demand; but others, who had their pots and kettles and unsold merchandise to take home, kicked against it, but it was of no use, for go they must.'

"The absence of so many vehicles from Washington on Monday made it necessary to impress other hacks and wagons for use in removing patients from the incoming boats and trains to the various hospitals in the city. The story of this train of hacks is worth telling.

"This train numbered 200 vehicles, and carried volunteer surgeons and nurses; a gentleman who accompanied it has related its story. Some of the hacks were such miserable old vehicles that they would certainly break down on those terrible roads; the horses had been in use all day, and were in no condition to go fifty miles without food. In one hack some good Samaritan had placed a quantity of liquor for the wounded; it was soon found by the drivers.

"The procession started at nine Saturday night, in charge of a lieutenant of the Provost guard, and escorted by some cavalry. The hacks rattled along amid the shouts and imprecations of the drivers, already feeling the influence of stimulants. Proceeding by the Aqueduct Bridge and Falls Church, the column soon broke up into fragments, and the cavalry disappeared in the darkness.

"Many hacks got off the road and found their way around by Alexandria back to the city. Some of the volunteer nurses induced other drivers to return.

"About daybreak on Sunday Fairfax Courthouse was reached, in a heavy rain. The road from here on was filled with troops, artillery, wagons, ambulances, and stragglers. When the column struggled up the Centreville hill there remained but sixteen of the vehicles that had started. Some had broken down, the horses of others had given out, many had escaped from the line and returned to Washington. It was decided not to go to the battlefield, there being no authority as yet. So they went to the field hospital on Bull Run, loaded up with wounded there, and returned to Washington on Monday.

"A number of surgeons and nurses who went with the party remained and were of real service. The train was a failure because it had no efficient management.

"The supplies from Washington had been unloaded at Centreville, but all the ambulances and wagons were busy hauling patients; and as

the medical department had no separate transportation these supplies could only be taken to the field in driblets. Besides, they were needed at Centreville, where there were wounded.

"The ambulances caused endless trouble; they seem to have been under no control. Those sent to Fairfax Station did not return. Those coming from Washington when once loaded returned to Washington. All went off with one load of wounded and disappeared, not to return."

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"After Coolidge's arrival he sent a telegram to the Surgeon-General, informing him of the situation and requesting that food, forage, and 300 ambulances be sent at once. The Surgeon-General had no 300 ambulances to send. The Army was marching into Maryland for a new campaign and Letterman was calling loudly for hundreds of ambulances.

"Supplies were made ready and the cab-drivers were again rounded up and sent to the field. It is interesting to learn just what such a measure actually accomplished. Here it is:—

"'Report of Assistant-Surgeon J. J. Woodward, U.S. Army.

"'On the afternoon of Thursday, September 4, I was requested by the Surgeon-General to collect and take charge of such hacks, omnibuses, and other vehicles as could be collected in the city of Washington, and to proceed with them to Centreville for the relief of the wounded. The vehicles having been collected by a company of cavalry, a few Army wagons loaded with cooked provisions and other supplies were added, and we set out about 11 o'clock, Thursday night; the train consisting of about one hundred hacks, forty ambulances, wagons, and other vehicles. We arrived at Centreville about noon next day (Friday), and having been permitted to pass by the Confederate officer in command, reached the orchard (at the Dogan House, east of Groveton), where most of the wounded were congregated, the same afternoon. During the following day (Saturday, 6th) the train was loaded with wounded, some six or seven hundred in number, and reached Washington about daybreak Sunday morning.'

"It appears that a train like this could be used to make one trip out and back, if properly managed, but could not be depended on for anything more."

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"Surgeon A. H. Smith, U.S. Army, of Rickett's Division, also went back to the field on Monday morning."

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"He and Surgeon Shackelford, of the 94th New York, went to where their brigades had been engaged and collected sixty or seventy of their wounded. They spent the night in carrying rails to build fires and in distributing soups, brandy, and supplies. Next day there was no food, but they happened to have tea and managed to find a camp kettle. The greatest difficulty experienced by all medical men was to find food and blankets.

"B. B. Emery, one of the volunteer nurses, says that on Wednesday they found a group of twenty-five or thirty wounded, who had had no

food or drink since Saturday; the nurses could not get a bite to eat from Monday to Wednesday, and many of the wounded died from starvation. Another nurse says he lived four days 'on corn and apples, like the rebels.'"

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"A last glimpse of the road to the rear: On Monday morning the correspondent of the *New York Tribune* left Alexandria for the front. The army was falling back on Washington.

"'For the next ten miles the road was filled with the trains of every corps, everywhere crowded, and frequently halting. . . . Mingled with the trains was a great number of ambulances and carriages filled with wounded and dying men. They had been all day long on the road, a day of confinement, privation, discomfort and torture. Many must have remained all night on the road; many also in wagons, which as carriages for the wounded are only one degree worse than ambulances.'"

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"On Saturday, August 30, Surgeon-General Hammond had the following notice published in the evening papers:—

"'AN APPEAL.

"'To the Loyal Women and Children of the United States: The supply of lint in the market is nearly exhausted. The brave men wounded in the defence of their country will soon be in need of it. I appeal to you to come to our aid; &c., &c.

"'WILLIAM H. HAMMOND,
"'*Surgeon-General.*'"

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Barrack Construction in France.—Chapter cxxxv of the Report of the Senate Commission on the French Army Budget for 1913 deals with the question of constructing new barracks. In 1908 an extensive scheme was drawn up; this was estimated to cost twenty-one million pounds. The Senate Commission criticizes the scheme severely and suggests that the expenditure might be greatly reduced by remodelling old barracks instead of constructing new ones. The Commission states that the health of the men in many of the older barracks is much better than in some of the newer buildings, because the men are allowed a much greater cubic space in the older buildings. They therefore propose that all offices, workshops, and stores should be removed to new buildings, to be cheaply constructed alongside the barracks, and that the men should occupy the rooms thus set free. They also recommend that there should be a space of 5 ft. between each bed. C. E. P.

Voluntary Aid Dressing and Refreshment Station (Dr. Baehr, *Das Rote Kreuz*, May 25, 1913).—The Voluntary Aid Detachments of Erfurt determined to organize a railway dressing and refreshment station exactly as it would be required in war. Permission was obtained to make use of the new cattle depot which was still under construction, but connected with the railway, municipal tramways, and water supply.

The existing buildings were allotted as follows: (1) A large hall as

kitchen; (2) a smaller adjoining room for storage of tables, benches, and cooking utensils; (3) a room for ablution; (4) a shed for the storage of cups, plates, bowls, knives, forks, &c., all packed in baskets.

The following personnel was found to be the minimum for carrying out the work: For medical assistance: Two medical officers, four lady nurses, and four stretcher bearers. For feeding the patients: One Sister in charge, ten women assistants, ten male assistants, five women for domestic duties.

In war time ambulance trains are not likely to be permitted to remain standing alongside the platforms of ordinary passenger stations on account of blocking the traffic, but will probably be shunted on to sidings, hence rest and refreshment detachments should be trained to work at sidings, making use of tents or temporary sheds.

The general idea of the day's practice was that an auxiliary ambulance train with fifty wounded would arrive about 11 a.m. The wounded and their attendants were presumed not to have had any warm meal for seven hours and the train was to proceed on its journey at 11.50 a.m. The special idea which was communicated to the Commandant of the Refreshment Party at 6.30 a.m. was as follows:—

On November 17 an auxiliary ambulance train with fifty wounded will arrive at the cattle station and remain for not more than thirty minutes; during this time patients and attendants are to be provided with a hot meal. Please arrange accordingly.

At 8 a.m. the refreshment detachment fell in at the cattle station. While water was being boiled in the kitchen some of the party were employed to fetch tables and utensils from the storerooms and to lay these out ready for use. (It may be noted that enamelled ware is inclined to become chipped and is not so satisfactory as white metal.) By 10.30 a.m. a good thick soup had been prepared; this was poured into the bowls and a roll of bread placed beside each. A cup of coffee with two biscuits was also ready for each person as well as a couple of sausages and a roll wrapped in paper, so that if pressed for time the man could slip them into his pocket.

In the meantime one of the rooms had been got ready as a dressing-room and another with basins of water, soap and towels for anyone who wanted a wash. Tables and benches sufficient to seat eighty persons had also been placed in readiness on the platform.

All preparations were completed by 10.45 a.m. Exactly at 11.15 the auxiliary ambulance train arrived; its S.M.O. reported as follows: The condition of four of the patients has become so serious that they must be transferred to a permanent hospital; four others require to be redressed; eight patients cannot leave the train; thirty-four are able to walk and feed themselves.

The Commandant of the Refreshment Detachment on receiving this report issued orders that: The four serious cases were to be given some refreshment and then carried to the ambulance wagon for transfer to the permanent hospital; the four cases requiring to be redressed were to be carried, one at a time, to the dressing-room, and after being redressed, were to be taken back to the train and fed; the eight cases unable to leave the train were to be fed by lady helpers; the remaining patients and train personnel were to be conducted to the tables where their meal awaited them.

These orders were carried out without confusion, but the time allowed was found to be somewhat short. C. E. P.

Reorganization of the Imperial Russian Military-Medical Academy. (*Militär.-Wochenblatt*, No. 30, 1913, p. 2,110).—An Imperial decree, published March 25, 1913, defines the new constitution and functions of the Academy. Formerly the pupils were regarded as civil students of medicine and not as military cadets, although they wore a semi-military uniform, and only those students who had received financial assistance from the State were obliged to join the Army Medical Service.

Under its new constitution the Academy is defined as a military educational establishment for the purpose of (1) Training medical officers mainly for the Army and Navy; (2) to give advanced instruction in medical subjects to the Army medical officers; (3) to train medical officers for the appointment of Professor.

The number of students is to be raised to 850, of whom 523 are to be trained at the expense of the State. Students will be regarded as belonging to the standing army, those attending the first two courses as "Volunteers" and those belonging to the special course as "Sa-urjad" (equivalent to assistant surgeons).

For disciplinary purposes the Academy is under the control of the Chief Army Medical Inspector. A director is placed in immediate command. The Academy will be inspected by direction of the Minister for War.

Students before being admitted must have passed the examination for matriculation in a University. Foreigners, Jews, men of bad character, and those not physically fit are not admitted into the Academy. On joining every student must be attested for military service. Time spent in study will be counted as service in the Army, and will reckon for promotion, pension, &c., provided the course is completed.

Students must conform strictly to the regulations in force, and are not permitted to belong to any club or society which officers of the Army are not allowed to join.

In the curriculum military medical subjects have been included. At the end of each course an examination is held. After completing the first two courses students have to serve as privates for four months at a camp of exercise. During the vacation following the completion of the third and fourth courses students are sent to military hospitals for instruction. To stimulate interest in their work a number of gold and silver medals will be awarded as prizes for essays.

For each year spent at the Academy at the expense of the State the student must serve one and a half years as a medical officer in the Army.

On joining the Army each student will receive a grant of £22 10s. for outfit and also the regulation surgeon's instruments.

The Director of the Academy is to be an Army medical officer appointed by the Minister of War.

The collar of the uniform coat, shoulder straps, and band of the cap will in future be dark blue with red piping. Junior students will wear a military cadet's uniform, senior students that of a junior Army medical officer. C. E. P.

German Army Medical Report for the Year October 1, 1911, to September 30, 1912 (excluding Bavaria).—The *Deut. Militärärzt. Zeit.* of March 20, 1913, gives an advance notice of the above report, from which the following notes are taken:—

The average annual strength of the army was 553,345.

Admissions to garrison hospitals	114,279
,, ,, barrack ,, ...	165,471
,, ,, ,, ,, and transferred to garrison hospitals	22,550
Total admissions for treatment	302,300

Ratio of all admissions per 1,000 of strength = 546·3.

The ratio has fallen below that of the preceding year by 42·8. The admissions have fallen in all groups of diseases except the venereal and urinary system, each of which show an increase of 0·4.

The total number of deaths in and out of hospital was 1,081, the ratio being 2·0 per 1,000 of strength. Of the total deaths 688 were due to disease, 171 to accidents, and 220 to suicide; the latter two categories show slight decreases on the numbers for the preceding year. The principal causes of death were tuberculosis, pneumonia, and appendicitis.

The total number of men invalided out of the Army during the year was 22,153 = 40·0 per 1,000 of strength; more than half the invaliding was the result of some disability existing prior to enlistment.

C. E. P.

Nicolle and Blaizot's Gonococcic Vaccine.—The authors state that they have been experimenting on the vaccine treatment of gonorrhœa and its complications for seven years. (*Comptes Rendus de l'Acad. des Sciences*, October 13, 1913, p. 551.) The toxicity of killed cultures of the gonococcus is so great that large injections of such a vaccine are prohibited, and small doses are without therapeutic effect. Moreover, sensitized vaccines cause local and constitutional symptoms when administered hypodermically; given intravenously, they sometimes excite a violent and dangerous general reaction. Inoculations of living gonococci are devoid of these evil consequences. The authors claim that they have succeeded in preparing a vaccine which is free from toxicity, and can be preserved indefinitely. The method ef preparation, which is also applicable to other vaccines, is not disclosed.

Twenty-four cases of gonorrhœal ophthalmia were treated with inoculations of this vaccine every day or every other day. Recovery ensued in all in three to ten days. On the day following the first injection, improvement was so marked that the eye could be opened.

Four to six injections at two-day intervals were administered to twenty cases of gonorrhœal epididymitis. Pain ceased twenty-four hours after the first inoculation, and the patients returned to work.

A man who had suffered from gonorrhœal rheumatism for eight months was cured by four injections. Two other similar cases recovered after two and eight doses respectively,

One hundred and seventy-eight cases of acute and chronic urethritis were treated with seven to eight injections combined with local remedies. The discharge often ceases after the third inoculation. A gleet of eighteen months standing was cured. C. B.

Correspondence.

THE TREATMENT OF GONORRHŒA WITH HEATED BOUGIES.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—I can only reply to Dr. Fulton's letter on the above subject, that neither Major Houghton nor I had any knowledge of the article to which he refers. We congratulated ourselves that we had given credit to every previous worker on this method of treatment, but it is impossible to avoid missing some important article in these days, however much one may try not to do so. I have read Dr. Fulton's paper within the past few months, and have been greatly interested in his results.

None of us can claim to be pioneers in this form of treatment. The idea of destroying the gonococcus in the urethral tissues by means of heat must have occurred to most of those who have studied its biology, and, as a matter of fact, I have recently discovered that in our paper we missed another important reference; Luys described in 1905[1] a thermo-electric bougie which he had devised for the treatment of gonorrhœa on the same underlying principle. The bougie which we described was, as we stated in our paper, a copy of the instrument devised by Dr. Valentine and used by him for many years.

I am, &c.,

L. W. Harrison,
Major R.A.M.C.

London,
October 8, 1913.

[1] *C. R. de l'Assoc. Franç. d'Urol.*, 1905, p. 298. Ref., "Textbook on Gonorrhœa," Luys and Foerster, 1913.

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Journal

of the

Royal Army Medical Corps.

Original Communications.

NOTE ON CERTAIN BODIES FOUND BY LIVER PUNCTURE IN A CASE OF FEVER ASSOCIATED WITH SPLENIC ENLARGEMENT.

BY MAJOR J. C. B. STATHAM.
Royal Army Medical Corps.
AND
DR. G. G. BUTLER.
West African Medical Staff.
(Published by permission of the Yellow Fever Commission.)

THE bodies referred to in this paper were found by us last May at Freetown in a mulatto girl suffering from fever and an enlarged spleen. Rough drawings, and a brief description of the bodies, with the clinical notes of the case, were sent to the Yellow Fever Commission, through Colonel Sir William Leishman, on June 3, 1913. The plate which illustrates this paper is reproduced from Sir William Leishman's sketches and it is largely owing to his encouragement of our work and his kindness in lending us the sketches that we are enabled to produce this paper so soon after our return from West Africa. We also have to thank the members of the Yellow Fever Commission for their special permission to publish these notes.

CLINICAL HISTORY OF THE CASE.

The material, which forms the basis of this report, was obtained from a female child, aged 8 years, who had been resident all her life

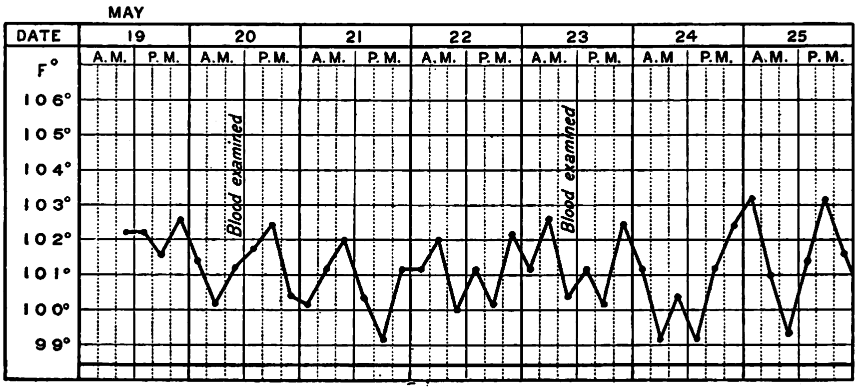
in Freetown, Sierra Leone. The child's father is a European and her mother a mulatto. The family do not make use of any anti-malaria measures and live as the ordinary natives do. The child was born at term; she has had numerous attacks of "fever." Dr. Renner, of Sierra Leone, also tells us he has often treated the child for "malaria." Except for these illnesses the child's history presents nothing of note. There are two other children in the family and the mother gives a similar history as to them. All three children show considerable enlargement of the spleen and the mother and maternal uncle show this in marked degree. This family of five all live in the same house.

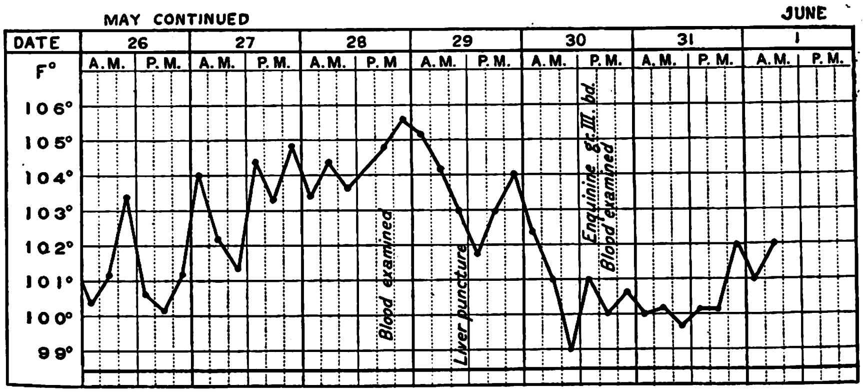
The illness for which the patient first came under our observation began on May 11, 1913; the only complaint, then, was "fever," and for this she was given 3 gr. of euquinine thrice daily, though no blood examination was made; this treatment was only carried out for two days. The next occasion on which the patient came under observation was on the morning of May 17, when the temperature was 102° F., and the mother made the statement that the "fever" was no better. On this occasion a blood examination was made but no blood parasites were found and the euquinine was repeated. Returning on May 19, the child was admitted to the Colonial Hospital at Freetown.

In appearance the child was like an ordinary pale English child. There was no complaint of pains of any sort, there was no rash, or marked pigmentation, or roughening of the skin. The child became quite contented and happy as soon as she got used to life in hospital. There was no vomiting on any occasion and no jaundice or earthy appearance. The child was thin but by no means emaciated, and marked sweats were not observed. The lungs and heart were quite healthy, but the latter was slightly displaced upwards. The abdomen appeared natural and there was no ascites. The liver dulness commenced at the fifth intercostal space in the right nipple line and extended to 1 in. below the costal margin, where a sharp edge was felt, but the consistency was normal. The spleen was enlarged and hard, reaching to the level of the umbilicus about four fingers' breadth from the costal margin. No other masses were felt in the abdomen. The superficial lymphatic glands were not enlarged; the tongue was quite clean and remained so as a noteworthy feature throughout the illness. The urine on admission showed a very faint cloud of albumen by the boiling test.

While in hospital there was very little to note except what is

shown on the temperature chart. The pulse showed no noteworthy feature, and varied with the temperature between the limits of 80 and 124; the bowels had a tendency towards constipation. Treatment was entirely symptomatic and no quinine was given except shortly before discharge and then purely as an experiment.





The blood was examined on four occasions, and on none of these were any parasites or malarial pigment seen; the differential counts on these occasions are tabulated below. A total white count was made on May 28 and revealed the presence of only 3,200 leucocytes per cubic millimetre.

Percentage	May 17	May 20	May 23
Polymorphonuclear	29	37	29
Small mononuclear	49	50·5	61
Large mononuclear	22	10·5	9·5
Eosinophile	—	1	0·5
Transitional	—	0·5	—
Mast cells	—	0·5	—

Two hundred cells only were counted on each occasion owing to their scarcity.

The fæces were examined on May 28, and showed no evidence of helminthic infection.

The urine on first admission showed just a faint cloud of albumen, but on May 26 there was noticed some opalescence apparently due to bacilluria, which, however, rapidly cleared up; a specimen taken on May 28 for culture purposes proved to be sterile.

In order to exclude the possibility of kala-azar an exploration of the liver was made on May 29, with a "Record" stovaine syringe; the puncture was made in the tenth intercostal space in the posterior axillary line, and a very little almost serous fluid was obtained, and then spread on slides. The report on these slides forms the most interesting feature of the case, and will be discussed below. Unfortunately no other exploration was allowed in this case, nor did we have the opportunity of similarly examining any other member of the family.

The only other clinical features to be noted are, firstly, the rather sudden drop in the temperature resulting from this minor operation, and, secondly, the effect on the urine apparently produced by a 3-gr. dose of euquinine. On May 30, 3-gr. doses of euquinine were ordered; within a few hours of the first dose $1\frac{1}{2}$ oz. of urine were passed which had the appearance of a blackwater urine. The specimen was reddish-brown in colour, quite translucent, and contained a considerable quantity of albumen, but no red blood corpuscles or casts. This urine was the only specimen of this nature which the child passed; the next specimen obtained was normal in appearance and did not contain any albumen.

Description of the Bodies found in the Liver Smears.

The smears made from the fluid obtained by liver puncture were stained by Leishman's method, the duration of the staining period being fifteen minutes. On examining the smears a number of curious "bodies" varying in size from 3 to 20 μ and more were seen. These "bodies" appeared to consist of masses of protoplasm stained as a rule a light blue or grey-blue colour, though the colour was a deeper blue in some cases. Their shape was usually round or oval in the smaller forms, but irregular in the larger ones (see plate). Enclosed in these protoplasmic masses were chromatin granules or "coccoid bodies" varying in size from minute particles (fig. 18) to

1 to 2 μ in diameter. In shape these granules were usually round or oval, but in some of the larger red staining forms the shape was irregular as if the chromatin formation was of a more open character (fig. 14).

Somewhat similar "coccoid bodies" were found in two instances enclosed in the cytoplasm of cells seen in the smear, but both these, and a mass of short rod-shaped forms seen in the thickest part of the smears, had the appearance of being more like bacteria than the granules of the "bodies."

The staining reaction of the granules varied; some were coloured red by Leishman's stain (fig. 14), some blue (fig. 15), while others had a violet tinge. In some cases the "bodies" contained granules of only one colour, but in others red, blue, or violet granules could be seen in the same "body."

There was no evidence in any of the "bodies" of a nucleus resembling a cell-nucleus either whole or undergoing chromolysis. No protozoa were seen enclosed in the red blood cells. The nuclei of the tissue and blood cells seen in the smears showed little or no chromolytic change.

Note on the Possible Nature of the "Bodies."

Are the "bodies" histological elements of the liver and the "coccoid bodies" the volutin or chromatoid granules of normal cells? While admitting that fragments of the cytoplasm of liver and endothelial cells, with the granules they sometimes contain, might become so detached from the cells as to resemble these "bodies," yet we are convinced from the numbers and the appearance of the enclosed "coccoid" bodies that this explanation is unacceptable.

Are the "bodies" portions of tissue cells, so affected by a virus that chromolysis has taken place and the fragmented nucleus remained *in situ?*

Have these chromatin particles been phagocyted by a neighbouring cell and a portion of its cytoplasm, with the phagocyted granules, been subsequently detached?

These questions are more difficult to answer, for chromatin particles derived from nuclear fragmentation have, before now, been mistaken for protozoa, but it may be stated at once that the nuclei of cells seen in the smear show few signs of chromolysis, while none of the "bodies" contain nuclei like cell-nuclei either whole or fragmented.

Martin Mayer [1], of Hamburg, when opposing the theory that bodies somewhat similar to these (the Koch's granules of East Coast fever) were protozoa, stated that he had found similar protoplasmic bodies with chromatin inclusions in animals dead of toxic diseases. Some of the bodies shown in the plate illustrating one of his papers seem obvious examples of chromolysis, but two of them are certainly very like those described by us. Mayer's observations, however, have not been confirmed and Koch's granules are now generally accepted as being schizont stages of *Theileria parva*.

Are these "Bodies" Protozoa?

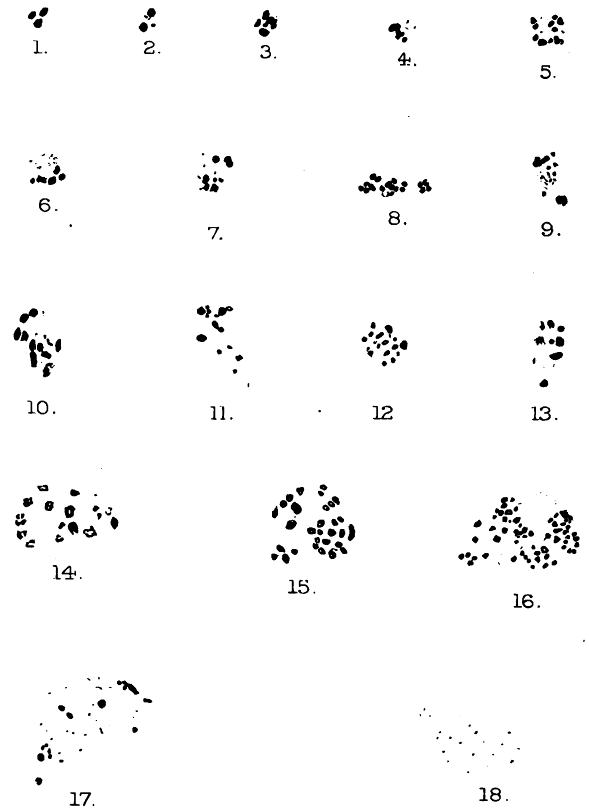
The appearance of the "bodies" with their symmetrically-shaped "coccoid" inclusions, their frequency in the smears, and the nature and history of the case suggest a protozoal origin.

One of the stages of development of *Hæmoproteus columbæ* slightly resembles these bodies, but a greater resemblance is found in the schizonts of *Theileria parva*. Koch's bodies as illustrated by Gonder [2] appear to be of two kinds, the one with larger red-stained granules, the other with smaller granules, some of which are stained blue as well as red. Gonder considers the former to be agamoganous and the latter gamoganous forms. An examination of the bodies which we describe shows somewhat similar differences (see fig. 14 as contrasted with figs. 15, 16 and most of the others). In East Coast fever, however, Koch's granules are frequently seen to be included in the endothelial cells, whereas no definite endothelial inclusions can be found in our smears.

The "bodies" found by us in Sierra Leone more nearly resemble those described by Captain Archibald [3] and found by him in a case of suspected kala-azar in the Sudan. These bodies, which Archibald showed to be convertible into Leishman-Donovan bodies when injected into a monkey, display, however, slight differences from those we found, for their average size is smaller, their shape more regular, the coccoid inclusions probably larger and their protoplasm more vacuolated.

While hesitating to pronounce any definite opinion as to the nature of these bodies found in Sierra Leone, we bring forward the suggestion that they may be the schizont stage of some protozoon, and may possibly have a similar relation to *Leishmania infantum* that Archibald's bodies appear to have to *L. donovani*.

The disease from which the child suffered was not unlike



W. B. L. del.

Scale of μ.

To illustrate "Note on certain bodies found by liver puncture in a Case of Fever Associated with Splenic Enlargement."

By Major J. C. B. Statham and Dr. G. G. Butler.

infantile kala-azar, and the fact that other members of the family who lived in the same house had big spleens increases the suspicion that it was a Leishmania infection.

The possibility that Leishmaniasis might be found in Sierra Leone had long been suspected by one of us and, some months before we found these bodies, fifteen dogs were examined for the presence of *L. infantum* but without positive results.

REFERENCES.

[1] M. Mayer. "Ueber das ostafrikanische Küstenfieber der Rinder," Beiheft 7, Bd. xiv, *Arch f. Schiffs-und-Tropenhyg.*, 1910.

[2] R. Gonder. "The Development of *Theileria parva*," &c., *Report of the Vet. Bacteriologist*, South Africa, 1909-10.

[3] Archibald. "An Interesting Case of Kala-azar," Journal of the Royal Army Medical Corps, May, 1913.

DESCRIPTION OF PLATE.

Figs. 1 to 3.—Small "bodies" containing 3 to 4 granules.
,, 4 ,, 6.—Large circular and oval forms showing more numerous inclusions.
,, 7 ,, 13.—Irregular-shaped "bodies" containing numerous "coccoid" inclusions.
Fig. 14.—"Body" containing large red-stained granules.
,, 15.—"Body" showing smaller blue-staining granules.
,, 16.—"Body" showing both red and blue-staining granules.
,, 17.—Large mass of protoplasm showing two ring-shaped inclusions.
,, 18.—Large mass of protoplasm containing fine chromatoid granules.

NOTE ON SOME CELLULAR BODIES FOUND IN A CASE OF MEDITERRANEAN LEISHMANIASIS.

By Major A. B. SMALLMAN.

Royal Army Medical Corps.

In the May, 1913, number of the Journal of the Royal Army Medical Corps, under the title of "An Interesting Case of Kala-azar," Captain Archibald gave particulars of a case which the present writer believes to be similar to the one he is about to describe.

The patient in this case was a child aged 2, who had been invalided from Malta as suffering from kala-azar. The history was that in March of the present year the child was taken ill with an attack of enteritis, but quickly recovered under treatment in hospital. Not long after leaving hospital, however, he again became ill, and again went to hospital, being on this occasion diagnosed as kala-azar, which was confirmed by spleen puncture and the finding of the parasites. The child was sent to England about the end of July, arriving in Aldershot about August 9. At this time he was suffering from an attack of cancrum oris, which had started very soon after embarkation. The lower lip and soft tissues of the chin were affected, and, as their condition was rather foul, it was thought better to treat the child in the Isolation Hospital.

During his stay in this hospital liver puncture was performed on October 2 by Major McNaught, R.A.M.C. Smears were made, and in addition some of the material so obtained was put into citrate solution. Novy-McNeal-Nicolle medium was not available at this time. In the smears no *Leishmania infantum* could be detected, but certain "bodies," which will be referred to later, were found in small numbers.

The father being now stationed at Woolwich, the child was transferred at the wish of its parents, and was admitted to the Families Hospital there on October 4. Consequently, it has been somewhat difficult to keep in touch with the case, but the kindness of Captain Pascoe, under whose care the child then came, has made it possible to obtain on one occasion some more material, the result of a splenic puncture, for examination.

During the stay of the child in the Isolation Hospital, Aldershot, his temperature fell gradually to normal for a time, probably due to the clearing up of the cancrum oris sore, which became quite healthy

in appearance. The general condition also improved. At this time a blood count showed 15,000 white blood corpuscles per cubic centimetre, a slight leucocytosis probably also due to the cancrum oris. A few days before removal to Woolwich, however, the temperature began to rise again. During October there was steady improvement in the general condition, together with some increase of weight, but at the present time, the beginning of November, the spleen is still enlarged to the level of the umbilicus and the temperature rises in the evenings to 100° or 101° F. There is also still some yellow discoloration of parts of the skin. The cancrum oris sore is healing rapidly. The case, therefore, furnishes another example of improvement taking place after the establishment of a leucocytosis consequent upon a septic condition.

Referring now to the "bodies" found in the smears made from the results of liver puncture, there can be little question that these are strikingly similar, if not identical, with those described by Captain Archibald in the Sudan case.

The points of similarity and difference may be tabulated as below, first premising that when "bodies" are mentioned the term includes the whole cell, if it be a cell, together with its contained "coccal bodies," which will be referred to as "granules." The reason for the use of this term will appear later.

Resemblance.

(1) *Bodies.*—Their size, and also the variation in size, is about the same in both cases.

The staining reaction of the cytoplasm appears to be identical. Vacuolation of the cytoplasm is a marked feature in both cases.

(2) *Granules.*—The size and general appearance of the granules are practically identical.

The staining reaction is the same in both, showing every gradation from a definite pink, through ruby red to purple, and on to a bluish-violet shade.

Difference.

(1) *Bodies.*—In the Sudan case the shape of the bodies is more circular or oval. In the Malta case they are more often quite irregular.

Vacuolation of the cytoplasm is frequently multiple in the present case. Reticulation of the cytoplasm is often seen, a feature not noted in the Sudan case. The above points are probably correlated, for the protoplasmic structure appears to be exceedingly

delicate, and it is probable that several were damaged in the process of making the smear.

(2) *Granules.*—Though many of these are perfectly circular or oval, much more irregularity of form is seen than in the Sudan case, the appearance being sometimes that of a rod or line, sometimes a prolongation in the form of a very fine streak or "tail" from a spherical granule, and in one case at least, a delicate band appeared to join two granules, one of which was stained a ruby red colour while the other had a bluish tinge. In some cases the chromatin-stained granule was extended along a vacuole, and in exact apposition with it, while in others the vacuole surrounded the granule. In addition, the proportion of very small granules was greater in this case, and the majority of the granules seen were stained a definite chromatin tint. The diplococcal arrangement was seen a few times and nearly always in respect of the darker, bluish granules. Free granules have not been recognized in the smears.

Some of these points of resemblance and difference will be seen in the plate, but many of them are not very easy to bring out.

It will be noted that the points of difference are in the main small and probably unimportant. The case is a little different when one endeavours to arrive at an interpretation of the "bodies." Captain Archibald speaks of the "coccal bodies" as cell inclusions. To do so is to postulate the existence of a cell in which the "coccal bodies" are included. Such would not appear to be the case, for one of the essential elements of a cell, viz., the nucleus, is not present. Apart from the cytoplasm of the cell and the contained granules there is no visible structure.

An alternative view therefore is that the "body" is a cell of which the "granules" form the nuclear apparatus which is undergoing a process of multiple fission of one form or another. Such a process is common, if not constant, among the protozoa during maturation of the gamete and as a preparation for the process of conjugation. And as in this process the vegetative chromatin degenerates to be either absorbed or eliminated we should have here an explanation of the division of the granules into two varieties, one, the pale-staining representing the degenerating vegetative chromatin, the other of approximately the same staining reaction as the nuclei of the liver cells and white blood corpuscles and representing the generative chromatin. This view would also account for the presence of minute particles of chromatin of a pinkish hue, representing the latest visible stages of absorption,

and also for the diplococcal arrangement of some of the granules being confined to the darker blue-staining ones consequent upon recent division. In this connexion it may also be well to recall the difference in the staining reactions of the tropho-nuclei and kineto-nuclei of the pre-flagellate stage of *Leishmania infantum.*

Adopting the above view, the "bodies" probably represent a stage in the life-history of a protozoal organism and as in both the recorded cases the patients were suffering from one form of Leishmaniasis, the natural assumption would be that the parasites under discussion represent a stage in the life-history of a Leishman organism.

The apparent disappearance of the ordinary form of the parasite, and the appearance of the forms above described coinciding with the improvement in the general condition of the patient, suggest an analogy with what occurs in another parasitic protozoon, e.g., the malaria parasite, and may indicate the preparation for a sexual cycle outside the body of the human host consequent upon the establishment in the host of conditions unfavourable to the parasite.

Captain Archibald also mentions having met with "bodies" apparently of the same nature in a similar case some twelve months previously, thus adding a third case to the series.

The speculation just entered into is an interesting one, though the evidence in its support may not be considered very strong.

In this case the "bodies" have not so far been seen in smears made from the spleen, not at least in the form found in the liver, which is contrary to the experience of Captain Archibald.

Some other points noticed in the examination of the smears may be mentioned here. Although a very large number of fields have now been carefully examined, not a single eosinophile corpuscle has yet been met with, and the same applies to the mast cells. The majority of the white corpuscles are lymphocytes. Polychromatophilia is common in the red cells as also is basophilia of the punctate type, the granules being often of relatively large size as shown in the plate. Nucleated red cells are also present in excess of the normal.

Many of the liver cells show dotted about in their cytoplasm a large number of dark-staining granules, but whether these are due to a pathological degeneration of the cytoplasm or are of the nature of inclusions it is very difficult to say. A specimen showing this appearance will be seen in the plate.

This note is admittedly very incomplete, partly from loss of contact with the case, partly from difficulty in obtaining the

records, and also from lack of time for complete examination of all the material so far at command; but it is considered advisable to put it on record at once, both in order to confirm the findings of Captain Archibald in the Sudan case, and also to obtain if possible further research and confirmation by officers stationed in Malta, who have greater opportunities for investigation. It at least appears to afford some further evidence of the similarity of the Sudanese and Maltese forms of the disease, a point on which some doubt has been thrown.

All the direct smears and the films made from the cultures in citrate solution and on the Novy-McNeal-Nicolle medium have not yet been completely examined. Should these furnish other points of interest they will form the subject of a further note.

My thanks are due, not only to the officers above mentioned for their kindness in providing the material (and clinical notes) in this case, but also to Major Fowler, R.A.M.C., for assistance in obtaining the specimens.

To illustrate "Note on some cellular bodies found in a Case of Mediterranean Leishmaniasis." By Major A. B. SMALLMAN.

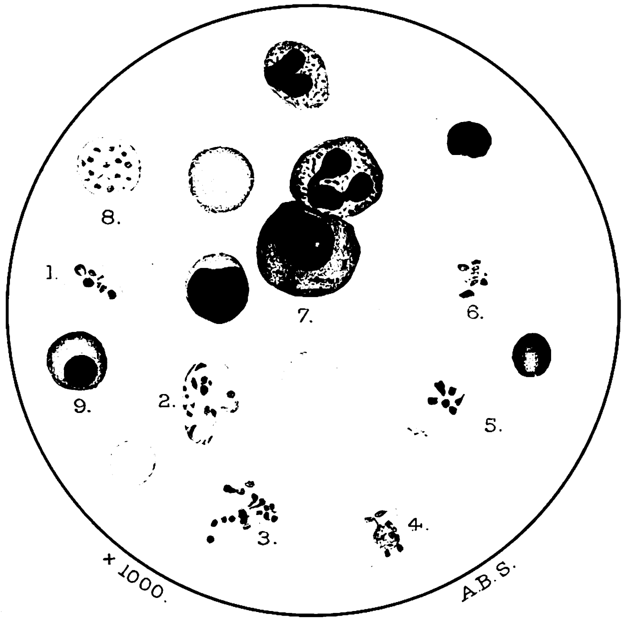


Fig. I.

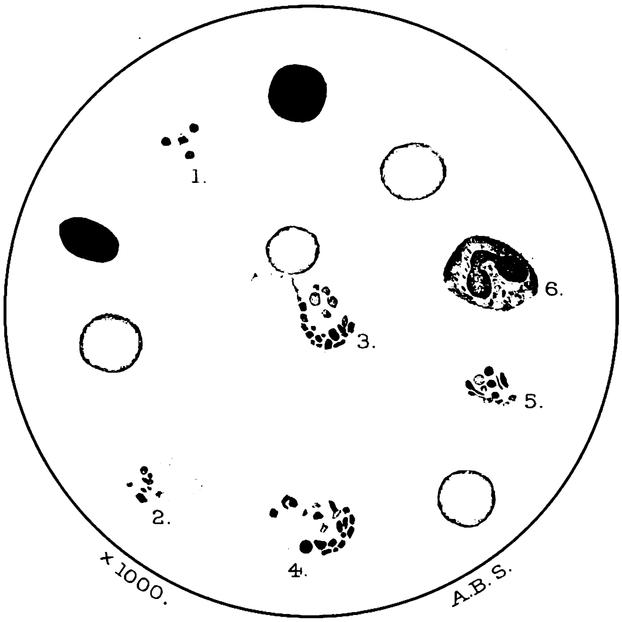


Fig. II.

FIG. 1.—Nos. 1, 2, 3, 4, 5 and 6. Cellular bodies described in the text.
No. 7. Liver cell showing dark granulation of the cytoplasm.
No. 8. Red blood corpuscle, showing basophilia.
No. 9. Nucleated red cell.

FIG. 2.—Nos. 1, 2, 3, 4 and 5. Cellular bodies.
No. 6. Vacuolated polymorphonuclear.

STAFF TOURS.

By Major S. H. FAIRRIE.
Royal Army Medical Corps.

In a previous article in this Journal (September, 1912) the subject of an "appreciation" was dealt with from the point of view of the Director of Medical Services of a large Field Force, but it did not include matters connected with the zone of collection. This article is intended as a continuation of the appreciation and deals with the zone of "collection," so that any officer acting as A.D.M.S. of an independent division may have a complete guide from which to compile his appreciation. It is to be remembered that the A.D.M.S. of a division operating independently becomes for the time being his own D.M.S. and D.D.M.S. Upon him will fall (at any rate for purposes of practice at staff tours and war games) the duties of selecting localities for his general and stationary hospitals, and of making all arrangements on the lines of communication for the sick and wounded of the particular division. As a guide to this he should refer to the previous article mentioned above, selecting such headings from the syllabus as may appear to him necessary according to the particular military situation set.

In mixed staff tours, such as are organized under brigade training arrangements, the independent division is the usual force selected, and as a R.A.M.C. officer always attends these tours, opportunities for practice in this particular *rôle* are of fairly frequent occurrence.

In selecting headings for an appreciation from a purely divisional standpoint one must consider firstly what the G.O.C. of the division will want to know about the medical arrangements; second, in what particular matters you wish him to help you, either in co-ordinating these with other branches, or in giving his sanction to any particular arrangements which may be necessary before you can carry them out.

The following syllabus is intended as a continuation of that previously published, and the paragraphs are numbered in sequence to those already given. The numbers inserted in the text refer to paragraphs R.A.M.C. Training, 1911, to which reference may be made.

SYLLABUS (*continued*).

(IV) COLLECTION.

(19) Give a list of the medical units available with the division (see War Establishments, latest edition).

Numbers of medical officers, . . . with regiments, . . . with field ambulances: Total . . .

Numbers of stretcher-bearers, . . . with regiments, . . . with field ambulances. Total . . .

Numbers of ambulance wagons . . .

State the carrying capacity of each class of transport, stretchers and wagons, in time-numbers (see footnote to 266).

(20) Sketch the arrangements you propose for the disposal of daily sick; distinguishing if necessary between the arrangements made for the force while moving, and when halted (174). State how the returning empty vehicles of the divisional supply train are to be utilized in passing sick to the refilling point (175, 239, 268).

(21) State your prospective arrangements for dealing with the wounded after an engagement (192, 207, 208, 209, 210), F. S. Regs., II, Sect. 90 (12), giving: Date, place, and character of fighting first expected; numbers and classes of casualties expected.

(22) Indicate how you intend to provide the link between the collecting and evacuating zones (188, 189) F. S. Regs., II, Sect. 90 (8) and (10). Your method of forming and utilizing the divisional collecting station, and how personnel and material are to be provided, should be included (185).

(23) If necessary you should make proposals for the collection, organization and utilization of transport material from local resources for use as auxiliary transport to assist in the collection and evacuation of wounded. You should also state by whom this transport should be collected, organized, controlled, and if required for any length of time, maintained (175, end, 185, 267, 269, 270).

(24) State your plans for feeding the sick and wounded while with the field ambulances (176, 185, 203).

(25) Sketch your proposals for forming convalescent companies and field convalescent depôts, if considered necessary (263).

(26) Your dispositions and scheme for utilizing the various medical units and medical posts during the immediate military operations in progress (167, 186).

As regards para. 19: The G.O.C. will like to know the means at your disposal for collecting wounded. Often at staff tours less than the established number of field ambulances is given to you in order to see what you will do.

In estimating the time taken to clear the wounded from that portion of the collecting zone served only by stretchers as a means of transport (which might fitly be called the "stretcher zone"), where all wounded must either walk or be carried lying down, the question is: What proportion of the wounded given in the authorized estimates as requiring transport sitting-up where wheeled vehicles are concerned, would require to be carried off the field on a stretcher? It is hardly conceivable that the whole 80 per cent (20 per cent able to walk, 60 per cent sitting up) of wounded will be able to walk off the field to the ambulance wagons, or dressing stations. Of the 60 per cent sitting-up cases mentioned in para. 265 R.A.M.C. Training, one might say 20 per cent could walk to the ambulance wagons unassisted, 20 per cent with assistance, and the remaining 20 per cent would have to be carried on stretchers. The proportions of wounded in the different categories for the "stretcher zone" would then be :—

40 per cent able to walk.

20 per cent able to walk with assistance.

40 per cent requiring transport lying down (including the 5 per cent severe cases only fit to be carried carefully by hand). We may, I think, reasonably take this last percentage as giving the proportions of wounded who will in all probability give work to the stretcher squads.

When one comes to estimate the time taken to remove any given number of mixed wounded in wheeled transport, the average proportions of the different categories must first be fixed. One lying down to four sitting up may be taken as a working figure for either long or short journeys. For long journeys where walking is out of the question, the exact proportions worked out from official figures gives 1 lying down to 4·666 sitting up, but if one is going to estimate to three places of decimals the subject becomes too complicated. So take the even number 1 to 4. Having fixed a working average for proportions of mixed wounded, it is now possible to work out the average carrying capacity of any class of vehicle used for the transport of mixed wounded. You should remember that for administrative purposes the actual carrying capacity is of less importance than the average capacity when large numbers of vehicles and mixed wounded are being dealt with. In order to make rapid calculations by the handy formulæ given in footnote to para. 266, R.A.M.C. Training, a working average carrying capacity per journey for each vehicle must be fixed. After omitting fractions this for mixed wounded works out as follows :—

Ambulance wagons (marks V and VI	8
" " (mark I)	5
General service wagons	4
3-ton motor lorry	12
30-cwt. motor lorry	6
Converted motor omnibus	20
Small country cart	4
Large country cart	8

As regards the motor omnibus specially fitted (para. 348 R.A.M.C. Training), the carrying capacity is given as four lying down and eleven sitting up, but it is highly probable that in such a roomy vehicle space would be found for another five sitting up cases, so that the average and actual carrying capacity may safely be taken at twenty.

As regards country carts, the sizes and kinds likely to be available would vary so much that any calculation of exact averages is impossible. However, the smaller kinds might be counted on as taking four, and the larger four-wheeled vehicle as taking eight mixed wounded.

For the particular purposes of para. 19, horse-drawn vehicles would alone need to be considered; either ambulance wagons, or other carts used as improvised ambulance wagons, such as would be needed with territorial troops. However, I consider that the carrying capacity of all classes of transport should be referred to, as it is of importance to know it.

When considering para. 20, arrangements should be made whereby the supply section of the divisional train when returning empty to the refilling point can be used for the clearing of the field ambulances of daily sick and wounded from casual encounters. State how such are to be convoyed (viz., what personnel from a field ambulance is to go in charge of them). Particular note should be taken of the instructions in F.S. Regs., II, Sect. 51, paras. 4 and 6, also Sect. 91, para. 10, i. The complete clearing of the field ambulances when an engagement is imminent is most important.

Taking para. 21: You should state how far the established means of collecting wounded meets the needs of the situation on your estimate of casualties. If insufficient, how you propose to supplement the means at your disposal. The main arrangements for evacuation should have been considered in Part II of the syllabus under "Evacuation." The chief task for divisions to carry out under this head is considered in the next paragraph.

Full and particular attention should be given to para. 22. The method by which it is intended to link the collecting and evacuating zones is not definitely laid down under a separate heading in R.A.M.C. Training at present, but reference should be made to paras. 188 and 189 and to F.S. Regs., II, Sect. 90, paras. 8 and 10, as valuable suggestions are there made. The early establishment of such a link is of immense importance, for upon it depends the easy and rapid clearing of wounded collected during an action; so that if a force has to retire, its movements may not be hindered by multitudes of slightly wounded. It must be remembered that battles even between such small opposing forces as single divisions may not be over in one day. Means must therefore be devised to evacuate all wounded straight away, directly they come in. The early establishment of such a link will also greatly facilitate the clearing of field ambulances after a victory.

It is the duty of the A.D.M.S. to assist in creating this link, and he should briefly sketch his plan. He should be careful not to detail for the evacuation of wounded, transport and personnel which are intended and needed for the work of collection (see paras. 175 and 267 R.A.M.C. Training and F.S. Regs., II, Sect. 91, para. 10, i). Note that Territorial divisions would use voluntary aid detachments. Regular troops operating at home might do the same (*vide* para. 274 R.A.M.C. Training).

The following must be borne in mind: It is the duty of the clearing hospital under orders of the D.M.S. conveyed through the General Staff to send forward detachments with transport to make connection with the collecting zone; when troops are marching or stationary, connection should be made at the refilling point; during battle or after, connexion should be made at whatever places the A.D.M.S. of a division has notified (to D.M.S.) that wounded have been collected and are awaiting evacuation. Such places would be at the sites of divisional collecting stations or of dressing stations left behind after an advance, at localities where field ambulances have been opened under the conditions mentioned in R.A.M.C. Training para. 189, lines 11 to 13 ("one or more subdivisions open, 3, 4 or 5 miles back, as a link between the fighting line and the clearing hospital.") The term "evacuating station" is suggested as most fitly describing this latter post. It is also the duty of a clearing hospital to advance as a whole after a victory to set free the field ambulances and to take over at once on the spot the sick and wounded from the field ambulances. It should be no part of the duty of a field ambulance to either convey or convoy wounded to

a clearing hospital, or to any point further back than a medical post established under divisional arrangements.

In referring to the divisional collecting station in your appreciation, or considering its location in your tactical dispositions, the following should be borne in mind: It should be the divisional medical post first formed, its locality should be notified to the troops in divisional operation orders. To it slightly wounded should be directed both from the firing line and from dressing stations, otherwise dressing stations soon become choked with multitudes of slight cases. At this post auxiliary transport may be collected and prepared to assist subsequent evacuation. It should not be placed on a road which is used as the main line of supply either of ammunition or of food, but it must be located in a position from which evacuation is easy and to which a detachment of the clearing hospital can have ready access. It is suitably located at a railway station, especially if trains can be used to evacuate wounded during the progress of a battle. It should be the first formed link between the collecting and the evacuating zone, and should be taken over at the earliest possible moment by a detachment of the clearing hospital sent forward for that particular purpose. It should not be so near the area of fighting as to encroach on main dressing stations, or serve as a temporary refuge for malingerers; or again, so far away as to give a tired and wounded man a long march in order to reach it; a man severely wounded enough to fall out should not be expected to march miles before receiving anything more than temporary first aid. The actual distance chosen from the scene of the expected fighting should not exceed four miles, and may with advantage often be less.

As regards the strength of the detachment detailed to open a divisional collecting station: It appears to be usual to detail only a tent subdivision to open this post. The writer desires to take this opportunity to advocate the employment of a whole section of a field ambulance, for the following reasons: a section of a field ambulance is a self-contained unit. The bearer subdivision corresponding to the tent subdivision so employed, if detached for the duty of collecting wounded may become separated by many miles from its companion tent subdivision, often to the extent of losing it for a day or more. Rations and most of the transport of the section would be with the tent subdivision. Bearer subdivisions are not tactically independent units, but should always work with or back to their own tent subdivisions; wide separation or independent working is not feasible. The two should never be treated as if

they constituted the old bearer company and field hospital. A field ambulance can be split into three but cannot be split into six independent tactical units. The bearer and tent subdivisions are organized and equipped as one unit, each for special duty but mutually dependent, and as long as this is so the fact must be respected and that they cannot be widely separated should be remembered. Another point: The work of a divisional collecting station may be arduous and the men of a tent subdivision are few. If the bearer subdivision is required for the work of collection the way to free it is to advance a detachment of a clearing hospital to take over the divisional collecting station, then the whole section is ready as a complete unit to go anywhere and do anything. The position of the divisional collecting station should be at once notified to the D.M.S., so that the clearing hospital may advance as soon as feasible.

As regards para. 23: The collection of auxiliary transport is usually carried out under the I.G.C. on the lines of communication. Local transport may, however, be required to supplement ambulance wagons (para. 175 end, R.A.M.C. Training), or even to take their place if the division has parted company with its medical transport, i.e., if it has been captured by the enemy. Local transport can only be requisitioned under the authority of the Q.M.G.'s branch of the General Staff. If required in any quantity except from a large town, mounted requisitioning parties would be a necessity. This means the employment of cavalry or mounted infantry for the purpose; except during periods of inaction these could seldom be spared from divisions. The preparation of vehicles for the transport of wounded is, however, a purely medical service, and when necessary may always be undertaken by divisions.

Para. 24: The feeding of sick and wounded. This is by no means a simple matter to arrange. The diversion of rations intended for combatant units to feed the sick and wounded of these units received by a field ambulance and before the wounded are evacuated, must be done by divisional arrangements, sanctioned by the G.O.C. and co-ordinated by an officer of the Q.M.G.'s branch of the Staff in conjunction with the chief divisional supply officer. The places where such diversion could be carried out would be either at the refilling point or in brigade areas. In the latter case regiments would have to give the number of their casualties to the brigade supply officer and an equivalent number of their rations would be handed to the field ambulances.

As staffed at present, field ambulances would require additional

cooks to prepare a meal if more than 1 per cent of the force is wounded. The guiding principle in this connexion should be, never to evacuate a wounded man until he has had a good meal. The resources of the medical comfort panniers are quite unable to provide this.

Para. 25: When considering the disposal of slight cases it should be remembered that out of total casualties and sick there will always be a certain proportion of men who will be fit for duty in a few days; it seems a pity to always send such slight cases to the evacuation zone. They might well march with the train or even help to form its escort. They should be formed into divisional convalescent depots during halts and periods of inaction. However, during periods of military stress, or when a battle is imminent, evacuation of all unfit men should be freely carried out, as divisions at such times should be clear of all unnecessary encumbrances.

As regards para. 26: Most divisional appreciations will include the scheme of tactical distribution of the field medical units for the immediate operations in progress. A full treatment of this subject merits one or more special articles. The general principles under this heading are now included in R.A.M.C. training. Reference to a few of the more common errors committed and a few leading principles must suffice for the purposes of this article.

Field ambulances or sections of them must be detailed by name to collect wounded over areas of front, and not behind particular bodies of troops, such as brigades, &c. This rule should be almost invariable. The exceptions are: A field ambulance detailed to follow a body of troops engaged in a rapid advance or a pursuit, when celerity of movement precludes any area being fixed by the A.D.M.S. Again, if a force be detached from the division to act independently, a field ambulance, whole or part, may be detailed to go with it. The tactical dispositions must then be left to the O.C. field ambulance in accordance with the orders issued by the O.C. detached force. The same applies to any detachment from a field ambulance sent with an advanced guard. The O.C. field ambulance reports to the O.C. detached force or advanced guard, and both act for the time being independently of the main body. Cavalry field ambulances will usually act with particular bodies of mounted troops. Their tactical disposition will be mutually arranged between the O.C. cavalry field ambulance and O.C. cavalry or mounted brigade.

The smallest initial allotment of field ambulances, or sections of the same as will suffice, should be made for the preliminary

stages of any engagement (F.S. Regs., II., Sect. 90, para. 9). The remainder should be kept in reserve at the disposal of the A.D.M.S. (R.A.M.C. Training, paras. 177, 188). A field ambulance, or any portion of one, once launched out for the work of collection cannot be recalled for duty elsewhere, any more than a battalion actually engaged with the enemy can be withdrawn to reinforce another point. When his units have become engaged the A.D.M.S. can only influence the course of the collection of wounded by employing his reserves (see Infantry Training, Sect. 121 (2)); the maxims there laid down apply with equal force to medical units. Reinforcements for unforeseen circumstances can only be arranged for from the reserves. Similarly a dressing station once opened and at work cannot be closed on the spur of a moment to open elsewhere; if additional dressing stations are required they can only be supplied from reserve tent subdivisions. Another very common mistake is to open dressing-stations too soon. The main work of collecting wounded takes place after a battle, and *what is nearly always forgotten, a victorious battle.*

The A.D.M.S. of a division should never try to command field ambulances or dictate details as to collecting wounded to the O.C. field ambulance. An A.D.M.S. should only direct the field ambulance to proceed to a "jumping-off place," and give it an area over which to work. The localities of dressing-stations, detail of arrangements for collection, and the keeping back of local reserves (188) should be left entirely to the O.C. field ambulance, in exactly the same way as the details of occupying ground or of advancing against a section of a hostile position are left to the O.C. of a combatant unit allotted to the particular task. F.S. Regs., II, Sect. 90 (10) should be carefully committed to memory.

As regards the medical arrangements made for defensive positions: The permanence of these positions will vary somewhat and so must therefore the medical arrangements. The tactical use of defensive positions is fully but shortly explained in Infantry Training, Sects. 138, 139, 147.

The limitations to separating tent and bearer subdivisions, before referred to, must be remembered in the general tactical distribution of field ambulances and their component parts. Undue separation is a common and very serious error.

The next subject to be considered is that of orders.

I have inserted after these remarks some instructions for the framing of divisional R.A.M.C. orders for military operations, for the march, and on routine subjects.

This section is very puzzling to beginners, and some such guide is useful to us all because we are not doing this class of work sufficiently often to have all the requirements constantly at our fingers' ends. Orders in general are considered in paras. 161 and 162, R.A.M.C. Training; the numbers of the paragraphs which refer to the particular subject matter of each order have been inserted in the specimen order.

The question has often been asked as to how our orders for movements and for tactical employment of field ambulances during field operations should be headed: "R.A.M.C. order" No. so and so, seems the correct heading. The heading, "Operation order" No. . . . seems wrong. Only the General Staff write, or rather issue, "operation orders." No administrative commander is empowered to issue operation orders under present regulations.

When issuing R.A.M.C. orders remember that the O.C. field ambulance does not see divisional operation orders. Therefore some information must be given as to the G.O.C.'s intentions, or as to movements of troops in progress; this may be verbal or included in the written order, but in every case it must be sufficient to enable the O.C. field ambulance to understand his task.

After each number in the specimen orders the subject matter which should be dealt with is explained. A subject which can more fitly be issued in routine orders should never be inserted in an order for a military movement. For instance, the general method to be followed in disposing of the daily sick is for routine orders; but directions as to the exact locality where sick are to be sent for evacuation, and as to who is to take charge of them before a battle or a movement of troops, being affected by the military operations in progress, have naturally therefore to be included in the R.A.M.C. orders concerning such military operations.

Every divisional operation order should contain information concerning the medical arrangements which it is necessary that all troops should know. It is the duty of the A.D.M.S. to draft "as required, paragraphs for orders issued in the name of the divisional commander." (R.A.M.C. Training, para. 162). Such a draft should be as follows:—

To General Staff Officer, X Division.

Draft for Divisional Operation orders. No. —

. . . . (place)

. . . . (date)

Reference to the particular map used.

Medical.

(1) A divisional collecting station will be opened at . . . .

(2) Dressing stations will be opened at . . . . (such and such places). See notes.

(3) Sick and wounded will be evacuated to . . . . (such and such a place). See notes.

(Signed) "X Y Z,"
Colonel,
A.D.M.S., X Division.

Time of issue. How sent.

As regards the inclusion of the localities of dressing stations in divisional operation orders, this will only be feasible when defensive positions are taken up which will be more or less permanent, and when there is plenty of time for the A.D.M.S. and the O.Cs. field ambulances jointly to reconnoitre the position.

It may also sometimes be advisable to notify the locality at which a tent subdivision has been opened. I have already suggested that this place should be called an "evacuating station," being the "link between the fighting line and the clearing hospital" mentioned in para. 189, R.A.M.C. Training. Place it at a railway station if you can.

This information will only be needed where there are detachments from the division operating more or less independently; otherwise they will not know how to dispose of their casualties.

Specimen Order by an A.D.M.S. of a Division, for Military Operations (162, 172, 173, 177).

Royal Army Medical Corps Order No. . . Copy No. . .

By Colonel "X Y Z," A.D.M.S., X Division.

. . . . (Building, such as an hotel, &c., from which orders are issued.)

. . . . (Locality of same town, village, &c.)

. . . . (date in figures.)

Reference to the particular map used.

(1) . . . . Position and strength of the enemy (177).

(2) . . . . Intentions of G.O.C. When fighting may be expected (177).

(3) . . . . Order for Field Ambulance (167, 173, 186).

(4) . . . . Ditto.

(5) . . . . Ditto.

(6) . . . . Order for establishment of divisional collecting station (177, 185).

(7) . . . . Order as to disposal of sick (174).

(8) . . . . Prospective arrangements for evacuation of

wounded from the field ambulances (F.S. Regs., p. ii., Sect. 90, (8) and (10).—(175, 177, 188, 189, 208, 209, 267)).

(9) . . . . Position of A.D.M.S. (Where he can be found).
Time of despatch?
How sent?
Copy No. 1 retained.
Copy No. 2 to O.C. No. X Field Ambulance.
Copy No. 3 to O.C. No. XX Field Ambulance.
Copy No. 4 to O.C. No. XXX Field Ambulance.

(Signed) "X Y Z,"
Colonel,
A.D.M.S., X Division.

Specimen "March" Order by an A.D.M.S. of a Division.

Royal Army Medical Corps Order No. . . Copy No. . .
By Colonel "X Y Z" A.D.M.S., X Division.

. . . . (Building, such as an hotel, &c., from which orders are issued.)
. . . . (Locality of same town, village, &c.)
. . . . (date in figures.)

Reference to the particular map used.

(1) . . . . Movements of troops concerned, such as Division will march to-morrow morning at such and such an hour, by so and so roads, to such and such a place. Starting point. . . . (as given in divisional orders). Order of march should be inserted in the margin or appended to the order (see No. 10).

(2) . . . . Arrangements for the advanced guard. The O.C. section or detachment field ambulance to report to O.C. advanced guard at a certain time and place (217).

(3) . . . . Similar arrangements for any detached force (171).

(4) . . . . Order for the march of the field ambulances with the main body. What unit to follow? Calculate when the leading field ambulance should pass the starting point (168).

(5) . . . . Arrangements for men falling out on the march. They are usually collected by the leading field ambulance, which should be directed to render a return at the end of the march (169).

(6) . . . . Arrangements for sick left behind. If a section of a field ambulance be detailed to take charge of them until evacuated, state how and where it is to rejoin.

(7) . . . . Directions for an officer from each field ambulance to go forward on arrival at a stated locality, to receive orders, &c., as to next camp or billets. (See F.S. Regs., I, Sects. 51 (3), and 56 (2)).

(8) . . . . Directions for an officer from each field ambulance to attend at a stated hour at A.D.M.S.'s headquarters for next day's orders.

(9) . . . . A.D.M.S. to state where he will be found during the march.

(10) . . . . Here append order of march of the various units of the division, if not inserted as a marginal note.

Time of despatch, how sent?

Copy No. 1 retained.

Copy No. 2 O.C. X Field Ambulance.

Copy No. 3 O.C. XX Field Ambulance.

Copy No. 4 O.C. XXX Field Ambulance.

(Signed) "X Y Z,"
Colonel,
A.D.M.S., X Division.

The following are some suggestions for subjects which may suitably be included in routine orders:—

(1) Instructions for disposal of daily sick.

(2) Procedure to be adopted in disposing of cases of infectious disease.

(3) Instructions as to replenishments of equipment and stores.

(4) How material in charge of regimental medical officers is to be replenished.

(5) General instructions as to feeding sick and wounded. Authority to overdraw rations if necessary.

(6) Returns required by the A.D.M.S. What records are to be kept?

The only remaining subject to be considered is that of reconnaissance. Reference should be made to paras. 4, 5, 6, 7, and 8, and 11, the medical situation in the previous article of September, 1912, number of THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. These will be found to give a fair guide as to what to report on. A field sketch should also be made of the area reconnoitred. Much useful information can be obtained from the county directory. Remember when estimating the amount of local transport at farms, that there may not be sufficient horses to put all the vehicles seen at the farms on the road at once; half would be a reasonable estimate.

Inquiries during reconnaissance are much facilitated if field service uniform is worn. One is not then taken for a trespasser. All questions at houses, shops and farms are readily and willingly answered. Matters are quite the reverse if plain clothes are worn.

FIFTY YEARS OF SANITARY EFFORT.[1]

By Colonel R. H. FIRTH.

In selecting for this lecture the title of "Fifty Years of Sanitary Effort in the Army of India," one was actuated by the idea that it afforded a means of reviewing the progress of sanitation in the Army, over a period practically synchronous with the present system of administration in this country. Fifty years carry us back to 1863, a year sufficiently remote from the upheaval of 1857 to present stable or normal conditions, and a year practically identical with the inception of systematic statistical returns concerning the health of troops. By sanitary effort, one means all those activities which aim at and contribute to the well-being of a community. Broadly, sanitary effort divides itself into two groups of activities, the general or indirect and the individualistic or direct. Among the former, one classes drainage and water projects, building schemes, commissariat organization, and the general care and treatment of the sick; while efforts to foster or develop moral character, education, the inculcation of knowledge concerning man and his diseases, including domestic hygiene, the segregation of the infected, and special attempts to immunize a community against infectious diseases, are all direct or individualistic in action. By the expression the "Army of India," one includes both European and Indian troops serving in this country.

To the thoughtful soldier, the presentment of a review of this nature calls for no apology; to the official civilian, its value may not be so evident: but even to him, confronted with the task of initiating and applying sanitary effort among and to the masses of India, a review of our experiences in military life should not be without interest, nor devoid of a lesson. It is true the facts of which one has to speak relate to but some 200,000 persons, a community small compared with the 280 millions of people in India; but even so, the results we have obtained among the lesser number are so good that they afford a definite encouragement to those embarking upon the greater task. The data concerning the well or ill being of the military community are available from

[1] Abstract from an address delivered at the United Service Institution, Simla, and re-published by permission of the proprietors of the *Pioneer*.

official sources, and by taking the numbers constantly sick, the numbers dying, the numbers invalided out of the service, and the numbers admitted for and dying from the more common preventable diseases, we can obtain reliable evidence as to the sanitary progress of the communities to which they relate.

Indian Troops.

In 1863 the strength of Indian troops was 58,462, in 1912 the strength was 131,182. During the fifty years under review the mean annual strength has been 105,871 men, 1,751 European officers, and 1,693 Indian officers. The facts as to the health of officers will be treated separately. Among the rank and file, the numbers constantly sick or numbers always in hospital in 1863 stood at a rate of 46 for every thousand men serving; in 1912 the corresponding ratio was 20. Their death-rate per thousand in 1863 was 15, now it stands at 4·6; the invaliding rate in 1863 was 17 as against 4·5 per thousand in 1912. These figures mean that the total wastage rate has fallen in the fifty years from 31 to 9 per thousand men or, on a basis of an existing strength of 131,182, it means a saving of 2,873 men annually as the difference between the rates of wastage prevailing in 1863 and 1912. If we take the more common diseases, we find that the malaria rate has fallen from 772 admissions per thousand in 1863 to 101 in 1912; similarly, dysentery accounts now for only 28 admissions per thousand men, as against 68 in 1863. Cholera is much less in evidence nowadays than formerly; in the last ten years only 381 deaths from this disease have occurred among Indian troops, whereas in the second and third decades of the half-century under review, the deaths from this cause numbered respectively 1,475 and 1,877. As against these evidences of sanitary progress the incidence rates of respiratory diseases, pneumonia, phthisis, and the non-malarial fevers show no improvement as between 1863 and 1912. On the contrary, both phthisis and enteric fever appear to be more prevalent now among Indian troops than they were fifty years ago. To some extent this increment may be the outcome of more accurate diagnosis and statistical exactitude; still the facts are suggestive, and especially so is the heavy incidence of both enteric fever and phthisis among Gurkhas, as to whose overcrowding in barracks complaints are made.

European Troops.

These numbered 67,525 in 1863, and in 1912 were 71,001. Their mean annual strength during the fifty years has been 63,163

men, 1,957 officers, 4,956 women, and 9,733 children. Among the men, the sanitary progress has been remarkable, and far in excess of what has been attained among the Indian troops. Thus, the constantly sick rate per thousand has fallen from 63 in 1863 to 29 in 1912; similarly, the death-rate has dropped from 24 to 4·6, the invaliding rate from 34 to 6·7, and the total wastage rate from 58 to 11 in the fifty years. The curious feature is, this change for the better has been only in the last ten years. As to individual diseases, we find the malaria rate down from 438 to 82; the respiratory disease rate fallen from 72 to 12; the phthisis incidence, which in 1863 was over 12, is now unity; hepatic diseases and dysentery, which respectively were 64 and 48, are now only 6 and 5 per thousand men serving. The same reduction is characteristic of the cholera figures; in the last decade but 224 deaths were recorded from that disease as against 3,090 in the first decade and 1,553 in the second. It is, however, in respect of enteric fever that the greatest advance has been made; here we find an admission rate of 20 reduced to 2, and the death-rate fallen from 5·6 to less than unity or 0·4 per thousand. The total significance of all these reductions among European troops is, as between 1863 and 1912, an annual saving of 1,348 lives, a lessened annual wastage of 3,316 men, and 2,186 fewer men constantly sick. Truly, a brilliant record.

Officers.

The European officers of both Indian and European troops are considered together. Their constantly sick-rate has dropped from 29 to 22 per thousand present; similarly, their death-rate has fallen from 17 to 4·4; but the invaliding rate of this class is as high as 16 per thousand as compared with the 6 for the men. Doubtless, social circumstance is the cause of this disparity. In respect of enteric fever, the returns for officers are far from satisfactory: their attack rate from this disease is as high as 6·6, or three times that of the men; the death-rate is, however, practically the same as that found prevailing for the men.

Women and Children.

It appears that there were 4,248 women and 7,046 children present in 1912, with European troops. The health of the women seems never to have been as good as that of the men, but in recent years it has been definitely less satisfactory. The constantly sick rate for women in 1863 was 32 per thousand of strength; in 1912 it had dropped to 21; their death-rate is now

9 per mille as compared with one of 44 in 1863. Enteric fever is three times more prevalent among the women than among the men, the rate being the same as that for officers, but the case mortality is twice as heavy. The mortality among the children was exceptionally severe in the earlier years under review. In 1863, the death-rate was 90 per thousand children, in 1912 it was 33. Cholera seems to have demanded a heavy toll of deaths among children in the sixties. Thus, in 1867 the death-rate was 105, and in 1869 it was 145 per thousand. These figures are for all children up to 15 years of age. If we take the infant mortality, it is far worse. In 1863, of each thousand infants under 6 months of age no less than 351 died annually, and of those from 6 to 12 months of age 235 died per thousand. These rates went on until 1880, and are in excess of the corresponding rates for infants in towns at home where the women are engaged in industrial work. Of recent years the infant mortality has improved, but even now it stands at 142 for infants under 6 months of age and at 73 per thousand for those between 6 and 12 months old. Considering that the mothers have only their domestic duties to perform, these figures are not altogether satisfactory.

Reviewing the figures as a whole, it must be said that the least satisfactory features are the statistics for officers, women and children. Enteric fever is far too prevalent, and the whole evidence suggests a lower sanitary standard in messes and married quarters than exists in the men's lines. The figures relating to both the Indian and European rank and file are good, especially those of European troops. The facts indicate existing rates among Indian troops to be now 54 per cent of what the rates were in 1863, that is, there has been an improvement of 46 per cent. Among European troops, the existing rates are but 18 per cent of the 1863 rates, showing an all-round improvement of 82 per cent. In both groups the improvement is traceable to sanitary effort. Among European troops, for the first forty years only indirect sanitary effort was at work; in consequence, the progress made was small and at times so small as to amount almost to a retrogression. Certainly until 1902, from a health point of view, the European troops were much inferior to the Indian troops. The change follows the reforms inaugurated as a result of South African War lessons. Sanitation became then a matter of discipline as affecting all branches and all ranks, and administrative orders made sanitary effort a living force among European troops, and not a mere name. The key-note was

knowledge and education. To the ground thus prepared followed the application of methods indicated by advanced medical opinion. Prominent among these were inoculation against enteric fever, and the establishment of the two enteric depots. All this meant sanitary effort in the direct or individualistic sense, as distinguished from mere indirect sanitary effort. The results are before us in the figures for 1912. The influence of inoculation on enteric prevalence and mortality is shown by the following figures for 1912. Among the inoculated, an admission rate of 2·2, a death-rate of 0·4 and a case mortality rate of 85, all per thousand; among the non-inoculated, an admission rate of 6·8 with a death-rate of 2·7 and a case mortality rate of 390, all per thousand. The influence of the enteric depots has been equally good; to them are sent all convalescents from enteric or other fevers until such time as technical examination indicates them to be free from infection. Since the depots were opened in 1908, no fewer than fifty-four enteric carriers have been detected. Under the old system with no depots, these fifty-four highly infectious men would have escaped detection and gone back to barracks to spread disease far and wide. What the aftermath of cases would have been it is difficult to say. No finer example, illustrative of the effects of indirect and direct sanitary effort, could be found than that presented by the health returns of European troops in India for the last ten years. They afford eloquent testimony to the advantages following the application of advanced medical ideas and practices to a community educated to receive them.

The facts presented by Indian troops are good in their way, but indifferent when we think that it has taken fifty years to secure them. Sanitary effort in the direct or individualistic sense does not exist among Indian troops. The conditions of service are peculiar, the men are not educated and imperfectly receptive of sanitary precepts and practices. There is, moreover, a reasoned reluctance to press these precepts and practices upon a people unripe for their enforcement. Such improvement as we do find is the result of indirect sanitary effort, and has been attained in spite of the Indian soldier himself. The sepoy is typical of the community from which he is recruited, and he brings with him into barracks and lines the ideas and habits of his village and home. Except at grave risk, any forcible dislocation of these ingrained ideas and habits during his period of military service is not to be contemplated. Therefore, we must take the Indian soldier as we find him, trusting to indirect sanitary measures to

reduce to a minimum the evil results associated with his prejudices and practices. Experience shows that in spite of the advantages which discipline and a corporate life give, the term of military service makes no impression on the sepoy and teaches him no lesson as regards sanitary ideals, and he returns to his village content to accept the conditions of domestic life and adhere to the ways of his forefathers in which he was brought up. In this matter, therefore, the work of the military administration is dependent on the efforts of the civil administration to level up the sanitary standard of the masses on whom we are dependent for our recruits. Until that higher standard is secured and the people themselves evince a desire for sanitary effort, further progress among Indian troops is likely to be small.

To the official civilian, the lesson from these Army experiences is clear. They emphasize once more the crying need for simple instruction in domestic hygiene among the masses and, above all things, a knowledge that most of man's diseases can be avoided by man's own efforts. To be of use this knowledge must reach the home and influence the rising generation at its most susceptible age. In this crusade our best sanitary missioners will be women, supported by travelling dispensaries and financial aid from municipalities or provinces to better congested areas or villages. To these efforts must be added active help from wealthy Indians and those of the upper classes. In India, to be a live force, sanitary effort must begin from the top and not from the bottom of the social scale. We had to do that in our own land, and the same is called for in this. In this matter of sanitary effort among Indians, the work of the soldier and the civilian are definitely complementary; any success on our part in the Army must operate as a leaven among the masses; conversely, any success on the civil side, among the many, cannot fail to be an aid to us among the relatively few.

THE UTILITY OF ENZYMES IN MALARIA.

By Major F. W. LAMBELLE.
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I take up a recent book [1], which mirrors accurately enough current opinion, and there I read, "Quinine is the one specific for all kinds of malarial fevers, as it absolutely destroys the malarial parasites." This is the general teaching of the schools, and when one first begins tropical practice one relies upon quinine as a certain cure for malaria. Some ten years ago experience led me to doubt this infallibility. In Hong-Kong about that time malaria was the chief cause of sickness among the troops. The admission rate to hospital for malaria was about 2,400 per thousand. A startling number! The equivalent of *every man in garrison being a patient in hospital nearly two and a half times every year!* Quinine in various forms, orally and hypodermically, in different courses of treatment was tried, but no method could be relied upon to obviate a relapse. During my service in Hong-Kong I should have had no difficulty in producing many cases showing records of seven or eight relapses.

These relapse cases have been a matter of concern because of the ensuing inefficiency, and recently with the troops in India efforts have been made to systematize the quinine treatment, to ensure that quinine is taken in sufficient doses, and that the treatment is spread over a sufficiently long time. These measures are complete enough, as the following details will show :—

(1) No case of fever is diagnosed as malaria until the parasite has been discovered in the blood.

(2) No case of malaria leaves hospital until the peripheral blood shows no *plasmodium*.

(3) After leaving hospital all malaria patients are placed on a "malaria register," and attend for further treatment.

(*a*) *Benign cases* receive quinine sulphate in acid solution, 10 gr., daily for one *week*, and afterwards three times weekly, until four months of quinine treatment have been completed.

(*b*) *Malignant cases* receive quinine in the same form, 10 gr., daily for one *month*, and afterwards thrice weekly for three months longer.

And yet relapses occur. Patients return to hospital deaf from cinchonism, ill with fever, and showing parasites in the peripheral blood.

I think the impression is very general that benign cases are easily cured and relapses rarely. Here in Upper Burma there seems little distinction between benign and malignant cases as regards their curability under quinine. Relapses seem as frequent in the one infection as in the other, the only difference being in the cachexia, which is persistent and progressive in bad cases of malignant infection. Major Lelean, R.A.M.C., writing in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS (November, 1911), had the same experience in the 7th Division in India. I quote his figures, as they show the importance of the subject: "Statistics have been kept which show the relapses occurring among a total of 1,053 malaria patients, who attended hospital at Meerut for three months subsequent to their discharge. During that period they received 15 gr. of quinine on two days per week. The drug was administered in solution and in the presence of an assistant surgeon, who kept a roster of these men and strictly enforced their regular attendance. We do not know what the mean daily strength was exactly, but it must have been approximately 170 for the eighteen months during which the results were kept. In that period there were 734 recurrences among these men, i.e., at the rate of 489 per year. It is, of course, obvious that this is but an approximate calculation, but it shows a per mille per annum attack rate amongst these men of no less than 2,876, which affords a considerable margin for error without losing its startling character." And continuing, he reiterates in slightly different form the question I have already suggested: "Within comparatively recent years it had been taught that the action of quinine upon malaria parasites was so certain that quinine could be relied upon for clinical diagnosis. Was that teaching correct?" I think not. Quinine has its sphere of usefulness, but it is an empirical remedy —a fundamental fact we have forgotten because the remedy is so time honoured.

In the foregoing I have used the word *relapse* in the ordinary medical acceptation of the term as applied to any disease—a recurrence. Colonel R. H. Firth, in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS (February, 1913), in speaking of apyrexial malaria wishes a distinction to be drawn between *relapse* and *recrudescence*. By *recrudescence of infection* he speaks of a recurrence of the fever due to increased schizogony of the parasite after a period of apyrexia. By *relapse of infection* he indicates a recurrence of the fever due to a reversion to schizogony after the establishment of sexual forms in the blood. Professor Minchin [2] in his "Introduction to

the Protozoa," says: "In the 'incubation' period of the disease schizogony alone occurs in all probability, but when the numbers of the parasite are sufficient to affect the health of the host, the reaction of the host against the parasite probably stimulates the production of the propagative phases, and Schaudinn has described the changes of the trophozoites which become sporonts."

In the light of the recent work [3] of Dr. John Beard, on the recurrence of dextro-rotatary albumins in organic nature and the part played by ferments in the protection of the animal body, all these things find a ready explanation. Schizogony of the parasite produces the clinical disturbance we call fever, the sexual forms are harmless, and the asexual growth of the parasite, as is the common feature with all asexual growths, can proceed to an unlimited number of generations or cell divisions, until checked by the natural protective ferments of the animal body. Just as the trophoblast is checked in its growth by the ferments of the developing embryo, so the natural protective ferments of the host react against the asexual phase of the parasite and sexual forms begin to appear. The varying degree of immunity, the degree to which the malaria remains dormant, is a measure of these natural protective ferments. In like manner, as these ferments are insufficient to destroy the asexual forms, the disease recurs. There is no essential pathological difference between the cases termed "relapse" and those called "recrudescence." Clinically, there is a difference only as to the time which has passed since infection. Before leaving this portion of the subject reference should be made to the recent publication [6] by Professor Emil Abderhalden on "Protective Ferments of the Animal Organism." In this work the author has gone a long way in the same direction as Dr. Beard's researches have led him.

In 1907 it was foreseen and foretold by Dr. Beard that the *plasmodium* of malaria would be readily destroyed by the enzyme trypsin, and the scientific principles involved have been enunciated by him in papers, published in 1907 and 1913 [3 and 4]. It may be of interest to cite one scientific conclusion from his recent memoir. In this Beard writes: "Since the organisms underlying the chief tropical diseases, such as malignant malaria, trypanosomiasis, sleeping sickness, yellow fever, relapsing fever, kala-azar, &c., are, so far as these attack human beings, asexual generations, it follows that the natural means of destroying the organisms of such tropical diseases, and of curing the patients, are the use *in combination* of the powerful pancreatic ferments, trypsin and amylopsin, as represented by the '1912' Fairchild injections."

Not until January, 1913, did the opportunity come to me of putting these principles into practice in cases of tropical disease and of seeing whether under treatment by ferments these relapses in malaria were preventable. To test this enzyme treatment cases of severe infection and those showing relapses were selected. Clinically, the results are most marked, the change in the patient within a few hours remarkable, and the benefit permanent. As circumstances have arisen which have interrupted this work, and as I do not know when I can carry the observations further, I think that these clinical results demonstrating the utility of the pancreatic ferments in the severer forms of malarial infection should be recorded.

The method of treatment has been by intramuscular injections of the enzymes, trypsin and amylopsin. The injections employed in the following cases were prepared by Messrs. Fairchild Brothers and Foster and are stable in the Tropics. Both ferments are supplied in glass ampoules holding about 1 c.c. The *injectio trypsini* has a digestive value of 1,250 Roberts units and it is the most potent preparation of trypsin made. The *injectio amylopsini* is of maximum potency and contains 500 Roberts amylolytic units. The preparations are sterile and stable. I have kept some of these ampoules for nine months in Central India without appreciable loss of strength. Before injection the contents of each ampoule should be diluted with normal saline 1 in 5. My usual practice is to take up the contents of one ampoule of trypsin and of one ampoule of amylopsin in a 10 c.c. syringe, and then fill the syringe with sterile normal saline. This amount I usually give as a single dose. Baetzner [5], using the same preparations in surgical tuberculosis, gives his injections hypodermically, but I prefer to give the injections intramuscularly, and select the buttock, finding that patients suffer the least inconvenience in this way. Using ordinary surgical technique in giving these injections, I have made some hundreds after this fashion, and no harm has ensued. The ferments diffuse slowly from the tissue, into which they are injected, and some local œdema remains for twelve to twenty-four hours, when it disappears. The local pain is little more than that due to the needle-prick. The effect of the trypsin on the normal tissues at the site of injection is practically *nil*. But the general effect, as seen in the cerebral type of case, is marked. The headache vanishes, the patient's restlessness ceases, the skin becomes moist and the temperature falls, the patient's aspect is totally changed in a few hours, and he feels fresh and looks bright. As a rule, a single injection is sufficient to clear

the peripheral blood of parasites. But in severe infections I think that *three injections,* given at intervals of about four days, are necessary to effect a cure. My previous experience [7] in the use of ferments in malignant disease has led me to repeat the injections, until the injections themselves cause a rise in the patient's temperature. This I have elsewhere called a "trypsin reaction." When this happens, I know that the patient is fully under the influence of the treatment. Usually this occurs in malaria with the third injection, and having proceeded so far the worst cases I have had to deal with have remained free from relapse.

The following cases were all British infantry soldiers. Three natives (Gurkhas) were also treated, but my notes of these cases are too fragmentary for inclusion:—

Case I.—Private C., No. 9457. Malignant tertian malaria with hæmaturia. Contracted malaria in Maymyo, Burma, November, 1912. December 5, 1912: Admitted to hospital; temperature 101° F.; malignant tertian rings found in peripheral blood. Quinine 10 gr. thrice daily. December 6: Morning temperature 103° F., evening temperature 102·4° F. Hæmaturia appeared; quinine stopped; arsenic given. December 7 and 8: Temperature normal, but hæmaturia continuing. December 16: Apparent recovery; discharged from hospital, but ordered to attend daily and to receive a dose of 10 gr. of quinine for one month. Relapse: January 11, 1913: Readmitted to hospital; evening temperature 100° F. Malignant tertian rings and crescents found in peripheral blood; quinine 10 gr. given thrice daily. January 13 to 16: Evening temperature 100° to 102° F. each evening. January 17: Quinine treatment stopped; first injection of trypsin and amylopsin. Evening temperature 100° F. January 19: Evening temperature 101° F.; blood shows crescents. January 21: Evening temperature 101·6° F. January 23: Evening temperature 96° F. January 24: Second injection of trypsin and amylopsin. Six hours after this injection the patient's temperature rose to 100° F., but the peripheral blood showed no parasites. January 25 and 26: Blood negative; no symptoms. January 31: Third injection of trypsin and amylopsin; discharged from hospital. The patient was seen by me on March 16, April 27, and May 31; he has had no further symptoms.

Case II.—Private G., No. 9876. Malignant malaria with relapses. Contracted malaria in August, 1912, and was treated in hospital from August 22 to September 2, malignant tertian rings being found in the peripheral blood. The first relapse

occurred in December. Patient was in hospital from December 13 to December 19, when again malignant tertian rings were found. The man was continuously under quinine treatment from August 22, 1912, to January 2, 1913, the regulation four months' course of treatment. Second relapse took place in January, patient being admitted to hospital on January 29. He was deaf from cinchonism, the blood smears were repeatedly negative, showing no parasites, but his temperature each evening rose to about 100° F. He was discharged from hospital on February 11, and ordered to attend daily for further quinine treatment. Third relapse. On March 2, patient was attending for his daily dose of quinine, when he appeared to me to look so ill that I detained him in hospital. His evening temperature was 99·2° F., and blood examination negative. March 3: Admitted to hospital complaining of pains all over, worst in bones and joints. March 4: Blood showed malignant tertian rings. In the evening the temperature rose to 103° F., and patient became delirious, showing cerebral symptoms. March 5: Very severe headache; first injection of trypsin and amylopsin. March 6: Headache gone; feels well; temperature in evening 99·6° F. March 7: No headache or other signs. Second injection of trypsin and amylopsin given. March 9: Temperature normal, neither signs nor symptoms, blood negative. March 12: Temperature continuing normal, no symptoms. Third injection of trypsin and amylopsin given. This was followed by a rise of temperature to 102·4° F.; blood smear negative. March 13: Blood smears again taken, no parasites found; leucocyte count: polynuclear, 50 per cent.; large mononuclear, 17·3 per cent.; lymphocytes, 24·7 per cent.; eosinophile 8 per cent. The changes in the large mononuclear and eosinophile white blood cells are noteworthy. March 18: Discharged to duty. On April 16 and May 19 I examined the patient. He had no further symptoms.

Case III.—Lance-Corporal J., No. 8459. Contracted malaria in October, 1912. Was treated in hospital between October 25 and 30, 1912, *benign tertian rings* being found in the blood. The quinine treatment was continued from October, 1912, to February 28, 1913, i.e., a four months' course. On March 8, patient had a typical attack of ague in barracks and was not seen by a medical officer. On March 10 he was brought to hospital with a temperature of 104·2° F., and *malignant tertian rings* were found in the blood. March 12: First injection of trypsin and amylopsin. March 15: Second injection of trypsin and amylopsin. March 18: Third injection of trypsin and

amylopsin. March 25: Discharged to duty. Up to June 16, 1913, the patient has had no relapse and no further symptoms. Query: Was this case a mixed infection of benign and malignant malaria, or a fresh infection of malignant malaria whilst the patient was taking quinine?

Case IV.—Private T., No. 9141. Benign tertian malaria. States he first had malaria in Rangoon some two years ago, and that he has been stationed in Mandalay since June, 1912, arriving in Maymyo, Burma, on March 8, 1913. Whilst in Mandalay he had five relapses of malaria. Maymyo, March 11: Detained with severe ague; temperature 103·8° F. *Benign tertian rings and gametes* in peripheral blood. March 12: Admitted to hospital; evening temperature 103·8° F. March 15: First injection of trypsin and amylopsin. March 18: Second injection of trypsin and amylopsin; blood negative. March 22: Third injection of trypsin and amylopsin. March 25: Discharged to duty. Up to June 16, he had no relapse, and no further symptoms.

Case V.—Lance-Corporal G., No. 6638. Benign tertian malaria. Contracted malaria in December, 1912. Was treated in hospital from December 28, 1912, to January 5, 1913. He had a relapse on March 14; temperature 102° F.; blood smear showed *benign tertian rings and gametes.* March 16: Temperature 100° F. March 18: First injection of trypsin and amylopsin. March 19: Evening temperature 102° F. (due to yesterday's injection). March 20: Temperature normal, blood negative. March 22: Temperature normal. Second injection of trypsin and amylopsin. March 25: Discharged to duty. Up to June 16, he had no relapse and no further symptoms.

Case VI.—Private S., No. 8561. Malignant tertian malaria. Contracted malaria in January, 1913. Was in hospital from January 31 to February 14, suffering from a severe attack, since when he had been taking quinine regularly. March 4: Arrived in Maymyo, attending three times a week for quinine. March 15: Reported sick with a temperature of 102·4° F. *Malignant tertian rings* found in peripheral blood. March 17: Temperature 101° F. in the evening. March 18: First injection of trypsin and amylopsin. March 19: Temperature normal. March 22: Second injection of trypsin and amylopsin. March 27: Discharged to duty. Up to June 16, he had no relapse.

Case VII.—Private S., No. 9600. Benign tertian malaria, quinine seemed to give no benefit. Contracted malaria in September, 1912. States that he has had three relapses out of

hospital. Returned from manœuvres on March 6, 1913. March 21: Reported sick; temperature 102·4° F. *Benign tertian gametes* found. Quinine 4 gr. four-hourly ordered. March 22: Temperature, morning 101·2° F., evening 101·6° F.; quinine continued. March 23: Temperature, morning 100° F., evening 101·6° F.; quinine 10 gr. thrice daily. March 24: Temperature, morning 99·6° F., evening 100° F.; quinine continued. March 25 to 29: Temperature normal; quinine continued. March 30: Evening temperature 100° F.; severe headache and joint pains. March 31: First injection of trypsin and amylopsin; evening temperature 100·2° F. April 1 to 4: Temperature normal, no symptoms. April 5: Second injection of trypsin and amylopsin. April 8: Discharged to duty. Up to June 16, no relapse and no further symptoms. After nine days of quinine treatment in this case the parasites were still able to produce fever, severe headache, and joint pains, all of which vanished after *one injection* of the ferments, trypsin and amylopsin.

Case VIII.—Private W., No. 9402. Benign tertian malaria. Contracted malaria in September, 1912, being treated in hospital from October 2 to 11. Completed a four months' course of quinine treatment in February, 1913. On March 27, reported sick, with a temperature of 102° F., *benign tertian rings* being found. On April 1 and 5 he received injections of trypsin and amylopsin. On April 10 he returned to duty, since when he has had no further symptoms.

Case IX.—Lance-Corporal F., No. 9327. Benign tertian malaria. Contracted malaria in October, 1912, being treated in hospital from November 1 to 12, and continuing the quinine treatment out of hospital until about the middle of January, 1913. On March 24, reported sick, temperature 104·8° F., and *benign tertian rings* were found. On April 1 and 5 he received injections of trypsin and amylopsin, the second injection causing a rise of temperature to 100° F. On April 10 he returned to duty, and has since had no further relapse.

Case X.—Private T., No. 8014. Malignant tertian malaria. First admission, severe double infection. May 19, 1913: Headache and colic; temperature 102·2° F.; quinine treatment begun. May 20: *Malignant tertian rings* found in peripheral blood. May 21: Temperature, morning 103·6° F., evening 102·4° F.; headache severe. May 22: Temperature, morning 104° F., evening 102·4° F. May 23: Temperature, morning 101° F., evening 100° F. May 24: Temperature, morning 99·4° F., evening 100·4° F. May 25:

Temperature morning 99·2° F., evening 99·2° F. May 26: Temperature, morning 98·6° F., evening 100° F. Quinine treatment stopped. First injection of trypsin and amylopsin. Compared with the eight days of treatment with quinine the progress made after one single injection of trypsin and amylopsin is marked. May 27: Better and brighter; evening temperature 98·6° F. May 28 to June 3, temperature normal. No further symptoms.

Case XI.—Private T., No. 9660. Mixed infection with debility. Patient, a tall, lank, phthinoid subject. Contracted malaria in January, 1913. March 16: Admitted to hospital with pneumonia of right base. March 22: Temperature 101° F. Blood examination showed numerous *benign tertian rings* and *malignant tertian rings* also. Quinine treatment begun. April 8: Discharged from hospital, but continuing the quinine treatment as an out-patient. Relapse. April 15: Readmitted to hospital; temperature 103·8° F.; malignant tertian rings in great numbers. April 16: First injection of trypsin and amylopsin. April 17: Evening temperature 100·6° F. April 18: Temperature normal. April 19: Temperature, morning 98·6°, evening 100° F. Second injection of trypsin and amylopsin. April 28: Temperature continuing normal, blood negative. Third injection of trypsin and amylopsin. May 3: Returned to duty; seen June 15; no relapse and no further symptoms.

Case XII.—Private H., No. 9535. Malignant tertian malaria with cerebral symptoms; first admission; severe cerebral type of case and double infection. May 12, 1913: Detained; temperature 102° F. at noon, 104° F. at 3 p.m., blood smear negative. May 13: Temperature, morning 101·6° F., evening 104° F. May 14: Temperature, morning 100° F., evening 102·4° F. May 15: Temperature, morning 99·6° F., evening 105° F. May 16: Temperature, morning 98° F., evening 103° F. May 18: *Malignant tertian rings* found; quinine treatment ordered. May 19: Transferred to my care; headache very severe; restless; continuing the quinine treatment. May 20: Headache and restlessness more marked, and patient became comatose. First injection of trypsin and amylopsin. May 21: Headache gone; patient looks fresh and eyes bright; temperature now 99° F.; all symptoms vanished. May 26: Second injection of trypsin and amylopsin. June 5: Discharged from hospital to duty.

"If a doctrine be challenged," said Pasteur, "it happens seldom that its truth or falsehood cannot be established by some crucial test. Even a single experiment will often suffice either to refute or to consolidate the doctrine" [8]. Again, the great investigator, Emil Fischer, set up the doctrine of "lock and key" regarding

the action of ferments by *two experiments, and two only.* The first experiment was to observe the fact, the second to confirm it [9]. In the foregoing pages twelve experiments are set forth, and every single one of these confirmed the scientific conclusions which led to their being made. For, as Carl Ernst von Baer wrote long ago, "That which always repeats itself cannot be conditioned by chance or passing caprice, but must depend upon a necessity."

REFERENCES.

[1] Ball, Eustace Reynolds. "Outfit and Equipment," p. 47, 1912.
[2] Minchin, E. A. "Introduction to the Protozoa," p. 361, 1912.
[3] Beard, J. "On the Occurrence of Dextro-rotatory Albumins in Organic Nature," *Biol. Centralb.*, vol. xxxiii, pp. 150-170, 1913. Also in *Medical Record*, March 29, 1913.
[4] Beard, J. "The Interlude of Cancer," *Medical Record*, 1907.
[5] Baetzner, W. "The Trypsin Treatment of Surgical Tuberculosis," *The Practitioner*, June, 1913, pp. 203-219, 6 plates.
[6] Abderhalden, Emil. "Schutzfermente des tierischen Organismus," Berlin, 1912.
[7] Beard, J. "The Enzyme Treatment of Cancer," pp. 185, 209, London, 1911.
[8] Vallery-Radot, René. "La Vie de Pasteur," Paris, 1901.
[9] Fischer, Emil. "Bedeutung der Stereochemie für die Physiologie," *Zeitschr. f. Physiol. Chemie*, vol. xxvi, 1898-99. *Loc. cit.*, p. 81.

THE SOLDIER'S HEAD-DRESS.

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The actinic theory of sunstroke advanced many years ago by Colonel Maude, R.E., and Colonel Duncan, I.M.S., has of late years found an advocate in Dr. Sambon.

The natives of warm countries have dark skins and exposure to the sun tans the European; it is therefore suggested that the latter should, in conformity with this hint from Nature, cover the most exposed parts of his body by some material, such as red, yellow or black, which intercepts the actinic or heat rays of the sun.

The question has recently come up for special consideration, and it is thought that the following account of experiments which were carried out by me when I was D.A.D.M.S. (sanitary) of the First (Peshawar) Division may be helpful to officers now working at the subject. My experiments were directed to ascertain the value of a lining of red calico in the soldier's ordinary helmet, which it was thought might fulfil the desideratum of intercepting the heat rays.

The helmets tested weighed 13½ oz., and were used without pugarees. None of the helmets available fitted me, so I was unable to wear one myself and thus ascertain if the red-lined helmet was cooler than the ordinary helmet. One helmet was issued to the Senior Medical Officer at Peshawar, and one to the Senior Medical Officer at Nowshera, for report as to comfort in wear; reports were submitted as follows:—

Practical Experience.

The Senior Medical Officer at Peshawar forwarded a report from a junior officer of the Corps, who stated he had worn the helmet at Peshawar and Nowshera during the summer months, i.e., from June to August. He complained that after wearing the experimental helmet he invariably got a headache, which he attributed to the weight of the helmet, being greater than that of the Cawnpore topee which he usually wears during the hot weather months. He regarded the lining of the helmet with red material as a great improvement, as it certainly made the wearer feel the sun's rays less. Except this subjective impression, however, he furnished no evidence as to the value of the red lining.

The Senior Medical Officer, Nowshera, reported at some length on the helmet. He considered that the red lining was an improvement, but pointed out the following defects in the soldier's ordinary

helmet, from which, as has been pointed out, the experimental head-dress only differed in the matter of lining.

(1) The helmet is too heavy.

(2) The thin layers of cork comprising the helmet are not sufficient protection against the fierce sunlight of the Punjab and Frontier Province.

(3) The shape of the helmet does not provide sufficient protection against the slanting rays of the rising and setting sun.

He advocated the adoption of a red-lined Cawnpore tent club helmet in lieu of the present regulation pattern.

Laboratory Experiments.

In carrying out my laboratory experiments the only methods available were:—

(1) The exposure of a helmet in the sun with a thermometer placed inside it; the direct rays of sunlight being carefully excluded from the thermometer by black material.

(2) The exposure of sensitized material inside a helmet for measured periods, direct rays being excluded as in the first series of experiments.

(3) Observation of the temperature recorded by a clinical thermometer inside a helmet.

For purposes of comparison the experiments were conducted simultaneously with the following varieties of head-gear:—

(*a*) The experimental helmet.
(*b*) A soldier's regulation khaki helmet.
(*c*) A soldier's regulation white helmet.
(*d*) An officer's khaki helmet, lined with black silk.
(*e*) A Cawnpore tent club helmet.

(1) *Experiments with Ordinary Thermometers.*—With reference to the first series of observations I would point out that they cannot be regarded as of much value, as even solar radiation thermometers are known to give large errors in actual use.

Six of these thermometers, even when they are of the same make and give identical readings in the shade, will when exposed together to the sun give results differing by some degrees.

If this is the case with carefully made instruments of identical construction, too much reliance cannot be placed on observations on the protective value of different kinds of material when placed over thermometers which have of necessity been subjected to rough treatment during transit in a tropical country.

As pointed out by Colonel R. J. S. Simpson, the differences in temperatures found beneath different materials are not greater

TABLE I.—Showing Temperature and Tint of P.O.P. found inside Helmets after Exposure in the Sun for one hour, with Details of Meteorological Conditions during the Observations. The Experiments were carried out on Suitable Days during the Hottest Months of the year.

	Observation I		Observation II		Observation III		Observation IV		Observation V		Observation VI		Observation VII		Observation VIII	
Time	9.45—10.45		11.15—12.15		10—11		10—11		9.40—10.40		9.30—10.30		9.30—10.30		9.30—10.30	
Temp. wet bulb ..	64·5—75° F.		62—63° F.		73—71° F.		73—75° F.		68—69° F.		71—73° F.		73—73° F.		70—73° F.	
,, dry bulb ..	67—76° F.		85—89° F.		78—78° F.		68—85° F.		78—81° F.		82—84° F.		77—78° F.		71—75° F.	
Meteor. conditions	Cool, bright and windy		Windy, cool day		Warm, bright day		Slightly windy, but bright		Cool, windy day		Bright, warm day		Cool day		Cool day	
Helmets	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.
	Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.	
Experimental ..	30	Deepest	41	Faintest	37·5	Deepest	42	All the same	39	All the same	41	Deepest	35	..	33	Deepest
Soldier's khaki ..	28·5	..	40	..	36·5	..	42		38		44	..	34	..	31·5	..
,, white ..	28·5	..	40	Deepest	36	..	40		36		39	..	33	Deepest	31	..
Officer's khaki ..	28	..	39	..	37	..	41		37		41	..	34	..	32	..
Cawnpore topee ..	29	Faintest	40	..	36	Faintest	38		36		38	Faintest	33	Faintest	31	Faintest

	Observation IX		Observation X		Observation XI		Observation XII		Observation XIII		Observation XIV		Observation XV		Observation XVI	
Time	9.40—10.40		10—11		9.45—10.45		10.5—11.5		9—10		10.20—11.25		10.25—11.25		11.5—12.5	
Temp. wet bulb ..	74—76° F.		74—75° F.		72—74° F.		73—74° F.		70—71° F.		72—71° F.		72—73° F.		74—72° F.	
,, dry bulb ..	78—84° F.		82—86° F.		76—80° F.		76—79° F.		72—75° F.		78—76° F.		77—79° F.		82—80° F.	
Meteor. conditions	Cool, still day		Warm, bright day		Cool day		Cool, bright day		Cool, sunny day		Cool, sunny day		Warm, bright, sunny day		Cool day	
Helmets	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.
	Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.	
Experimental ..	41·2	Deepest	42	..	36	Deepest	36	Faintest	32	Deepest	35	Deepest	32	Deepest	35	..
Soldier's khaki ..	40	..	41	Deepest	36	..	35·5	..	32	..	35	..	32	..	35	..
,, white ..	38	..	39	..	35	..	34	Deepest	29	..	32·5	Faintest	30	Faintest	34	Lightest
Officer's khaki ..	39	..	39	..	36	..	35·5	..	30·5	..	35	..	33	..	36	..
Cawnpore topee ..	38	Faintest	38	Faintest	35	Faintest	34	..	30	Faintest	34	..	35	..	35	Deepest

	Observation XVII		Observation XVIII		Observation XIX		Observation XX		Observation XXI		Observation XXII		Observation XXIII	
Time	11.5—12.5		10.45—11.45		11.45—12.45		10.15—11.15		10.15—11.15		11—12		10.45—11.45	
Temp. wet bulb ..	75—73° F.		72—73° F.		74—75° F.		75—77° F.		73—74° F.		74—75° F.		73—74° F.	
,, dry bulb ..	83—82° F.		79—80° F.		78—81° F.		80—81° F.		79—81° F.		79—81° F.		77—78° F.	
Meteor. conditions	Dry, sunny day		Bright, sunny day		Bright, cool day		Bright, sunny day		Cool, cloudy day		Bright, sunny day		Cool, bright day	
Helmets	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.
	Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.	
Experimental ..	24	Deepest	40	Deepest	37	Dark	39	Faint	34	Deep	36	Faintly dark	38	Dark
Soldier's khaki ..	32·5	Dark	36	Slightly dark	37	Faintest	37	Slightly dark	33	Faint	37	Dark	36	Deepest
,, white ..	34	Light	39	Faintest	36	Faint	38	Deep	32	Slightly dark	36	Deepest	38	Faint
Officer's khaki ..	33	Slightly dark	39	Dark	37	Slightly dark	39	Deepest	31	Deepest	35	Faintest	37	Faintly dark
Cawnpore topee ..	33	Lightest	37	Faint	36	Deepest	37	Faintest	32	Faintest	..	Faint	36	Faintest

	Observation XXIV		Observation XXV		Observation XXVI		Observation XXVII		Observation XXVIII		Observation XXIX		Observation XXX	
Time	11.30—12.30		12.15—1.15		11.45—12.45		11.15—12.15		11.15—12.15		11.15—12.15		11.45—12.45	
Temp. wet bulb ..	73—73° F.		77—76° F.		67—73° F.		73—75° F.		68—69° F.		77—74° F.		73—69° F.	
,, dry bulb ..	77—77° F.		77—80° F.		73—76° F.		76—75° F.		75—76° F.		80—77° F.		73—73° F.	
Meteor. conditions	Cool, cloudy day.		Bright, cool day, rained 7.10 a.m.		Bright, warm day		Cloudy, cool day		Cool, bright day.		Warm, sunny day		Cool, cloudy day	
Helmets	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.	Temp. of interior of helmet	Tint of P.O.P.
	Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.		Deg. C.	
Experimental ..	36	Dark	39	Dark	38	Dark	37	Faint	35	Faint	36	Faintly dark	32	Faint
Soldier's khaki ..	37	Deepest	42	Deepest	35	Deepest	36	Dark	36	Deepest	38	Dark	31	Dark
,, white ..	35	Faint	38	Faint	38	Faintly dark	36	Faintly dark	33	Dark	40	Deepest	30	Faintly dark
Officer's khaki ..	32	Faintest	40	Faintly dark	36	Faintest	34	Faint	36	Faintest	37	Faint	30	Deepest
Cawnpore topee ..	33	Faintly dark	37	Faintest	33	Faint	35	Deep	31	Faintly dark	38	Faintest	32	Faintest

Note 1.—The shade temperatures of wet and dry bulb thermometers were recorded at the commencement and at the end of each observation. The first figure in each case refers to the temperature when the helmets were first exposed, and the second to the temperature in the verandah at the end of the hour's exposure. All temperatures in helmets are in Centigrade.

and may be less than those between solar radiation thermometers in which the disturbing effects of connection currents do not reach the bulb.

I carried out thirty observations of this nature at Cherat during the months of June, July, August and September, i.e., the hottest season on the North-west Frontier of India.

TABLE II.—RESULTS OF EXPERIMENTS WITH ORDINARY THERMOMETERS PLACED IN INTERIOR OF HELMETS WHICH WERE THEN EXPOSED TO THE SUN.

Helmets	Highest temperature. Number of times recorded	Lowest temperature. Number of times recorded	Same temperature as highest of other helmets. Number of times recorded	Same temperature as lowest of other helmets. Number of times recorded
Experimental helmet	12	1	10	*nil*
Soldier's khaki	4	2	6	1
Soldier's white	1	4	3	9
Officer's khaki	1	5	5	1
Cawnpore topee	1	9	1	9

Out of 30 observations the experimental helmet recorded highest on 12 occasions, lowest on one occasion, and the same temperature as the highest of the other helmets on 10 occasions.

All temperatures are Centigrade.

TABLE III.—RESULT OF EXPOSURE OF SENSITIZED PAPER IN THE INTERIOR OF THE HELMET.

Helmets	Darkest tint with P.O.P. Number of times recorded	Lightest tint with P.O.P. Number of times recorded	Same tint in all helmets. Number of times recorded
Experimental helmet	11	2	
Soldier's khaki	6	1	
Soldier's white	5	4	2
Officer's khaki	3	5	
Cawnpore topee	3	16	

The darkest tint was produced in the experimental helmet on 11 occasions, and lightest on 2 occasions.

TABLE IV.—OBSERVATIONS WITH CLINICAL THERMOMETERS IN THE INTERIOR OF HELMETS IN ACTUAL WEAR.

Helmets	Above 95° F.	Below 95° F.
Experimental	2	28
Other helmets	*nil*	20

The results of my observations are shown in Tables I and II. The former table gives particulars of each observation and the latter summarizes the results.

(2) *Exposure of Sensitized Material, inside Helmets.*—The plan adopted was suggested by the method used in the Watkins and Wynne Exposure meter, and consisted in simply recording the tint produced on sensitized photographic paper after exposure for a measured time in the interior of the various helmets.

Direct rays of light were of course carefully excluded by black material.

The results of each experiment are shown in Table I, and the thirty observations summarized in Table III.

(3) *Observations with Thermometers placed inside Helmets in Actual Wear.*—Colonel Firth points out " Theory and Practice of Hygiene," p. 833), that sufficient experiments have not been made either: (1) with regard to the temperature to which the skin of the head and neck is raised by the sun's rays in the Tropics; or (2) with regard to the heat in the interior of the caps and hats in warm climates.

The only instruments available for these experiments were clinical thermometers. These instruments are not constructed to record temperatures below 95° F., so that most experiments merely showed that the temperature was below this figure.

It is by no means easy to fix a clinical thermometer in a helmet, so that thermometers were somewhat frequently broken in carrying out these observations. I would have endeavoured to obtain a special thermometer, but was unable to find a suitable type quoted in any of the price lists consulted. I suggest that a number of special instruments might be obtained and experiments conducted on this interesting subject in various parts of India.

The results of this group of observations are given in Table IV.

Conclusions.

The results of my four series of observations may be summed up as follows:—

(1) From practical experience in actual wear, helmets lined with red material are stated to be cooler than the ordinary khaki head-gear.

(2) From observations with thermometers the temperature in the interior of the experimental helmet was higher than that recorded in four other varieties of head-gear exposed to the sun at the same time on twelve occasions, and lower on only one occasion out of thirty observations.

(3) Exposure of sensitized material showed that the tint obtained in the interior of the experimental helmet has, on eleven out of thirty occasions, been darker than that produced in four other kinds of head-dress.

(4) The temperature recorded by a clinical thermometer inside a helmet has on two occasions out of thirty experiments risen to about 95° F. In a similar number of experiments the temperature in the interior of Cawnpore tent club helmets and Curzon topees has always been below this figure.

DAIRIES AND COWSHEDS, THEIR EFFECT UPON THE PURITY OF THE MILK SUPPLIED TO MILITARY HOSPITALS, TROOPS AND MARRIED FAMILIES.

By Staff-Sergeant E. B. DEWBERRY.
Royal Army Medical Corps.

(*Continued from p.* 580.)

The Dairy or Milk Store.

Precautions to be taken by purveyors of milk, and persons selling milk by retail, against infection or contamination. Every purveyor of milk, or persons selling milk by retail shall take all reasonable and proper precaution in and in connection with the storage and distribution of milk and otherwise to prevent the exposure of the milk to any infection or contamination.

"He shall not deposit or keep any milk intended for sale—in any room or place where it would be liable to become infected or contaminated by impure air, or by any offensive, noxious or injurious emanation, exhalation, or effluvium: or in any room used as a kitchen or as a living room; or in any room or building, or part of a building communicating directly by door, window, or otherwise with any room used as a sleeping-room, or in which there may be any person suffering from any infectious or contagious disease, or which may have been used by any person suffering from any such disease, and may not have been properly disinfected; or in any room or building, or part of a building, in which there may be any direct inlet to any drain." (Model Regulations, Local Government Board, Dairies, Cowsheds, and Milkshops, Part III.)

Two rooms are usually set apart, one room for the storage of milk, cream, or butter (the milk store), the other for the cleansing and storing of the various utensils (the utensil store), and which also contains the necessary apparatus for straining and cooling the milk.

The Milk Store.—This store should be well lighted, ventilated, and kept as cool as possible. It should be constructed inside of materials which can be easily cleaned down, and all windows and panels of doors should be protected by wire gauze. A good plan is to remove the glass of the windows and fix wire gauze in its place, so as to prevent the entrance of flies. The floor should be well paved with flag stones, or made of concrete or other suitable sub-

stance properly set in cement, and should slope towards an opening in the wall leading to a properly trapped gulley outside the dairy, so that the floor can be periodically washed down. The inner surface of the walls of the milk store should be covered with some hard, smooth, impervious substance, and if not painted or enamelled a white colour should be limewashed, as in the case of cowsheds. The general condition of dairies in small milk farms is most unsatisfactory. They usually open off the kitchen, which in the majority of cases is also the dwelling-room, and very commonly they serve as sculleries and rooms for the reception of dirty linen, vessels, and all kinds of articles which it is thought desirable not to keep in the dwelling-room. The weekly washing of clothes, also the daily washing of miscellaneous things, is carried out there; and one has frequently seen milk vessels used for washing the filthiest articles. Such a state of affairs is bound to happen whenever the dairy communicates directly with the dwelling-room, which should therefore be strictly prohibited. The condition of retail milk shops in towns is often not much better, the milk and all utensils being kept in the ordinary dwelling-room.

The Utensil Store.—This should be constructed practically on the same lines as the milk store. A boiler will have to be provided to supply quantities of boiling water necessary for cleansing purposes. A cooling apparatus (necessitating a constant supply of water), or a mechanical refrigerator, should in all cases be installed for cooling the milk after it has been strained through fine muslin or a cotton wool strainer. As a result of this cooling process, not only does the milk keep better, but any germs it may contain do not multiply so rapidly. The muslin referred to above should be boiled after it has been used.

In modern dairies the practice of pasteurizing the milk before cooling it is an excellent one, and where it is desired to carry out such a process, a separate room for the purpose should be used.

Cleanliness of Milk Vessels.—"Every cowkeeper shall from time to time, as often as may be necessary, cause every milk vessel that may be used by him for containing milk for sale to be thoroughly cleansed by steam or boiling water, and shall otherwise take all proper precautions for the maintenance of such milk vessel in a constant state of cleanliness. He shall not keep milk for sale, or cause or suffer any such milk to be placed in any vessel, receptacle, or utensil which is not thoroughly clean." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part III.)

From the above regulations it will be seen that after having

been in use all utensils, cans, churns, and bottles, &c., must be thoroughly scalded out to keep them clean and sweet. They should afterwards be stored where they will not be likely to become contaminated by dirt or dust. Owing to the objectionable practice of keeping milk-cans in the street, or road, without any covering, and exposed to the dust and filth of a town atmosphere, it is very necessary that when they are received back in the dairy they should be subjected to thorough cleansing with boiling water. This cleansing is also required on account of the fact that the cans are often used in houses for various purposes for which they were never intended.

An excellent practice nowadays is to bottle the milk after it has been pasteurized and cooled, thus ensuring the milk being received by the consumer in a good and wholesome condition. The bottles are sealed with tight-fitting discs. The outstanding advantages of this form of delivery are the transparency of the vessel and the consequent ease of inspection, and the imperviousness of the vessel, which largely prevents contamination of the milk.

No colouring matter or preservatives in any form are allowed to be added to milk.

Delivery.—All the vehicles should be kept at all times scrupulously clean, frequently hosed down and used for the conveyance of milk only.

All persons entrusted with the handling of large quantities of milk should be instructed as to how this important article of food can easily become contaminated, and how disease germs may, in suitable environment, gain access through exposure, and within a few hours develop and multiply in the milk with enormous rapidity, especially in very warm weather. It should be emphasized that it is most important to use the greatest care and cleanliness in dealing with milk, as several serious diseases may be acquired through drinking milk in which disease germs are present.

"Any cowkeeper shall not cause or suffer any cow belonging to him, or under his care or control, to be milked for the purpose of obtaining milk for sale, unless at the time of milking the udder and teats of such cow are thoroughly clean, and unless the hands of the person milking such cow also are thoroughly clean and free from all infection and contamination." (Model Regulations, Local Government Board, Dairies, Cowsheds and Milkshops, Part III.)

Men and women employed in milking cows should be provided with clean white caps and overalls made of some washable material,

and also with clean towels and nail brushes. Arrangements should be made so that the persons employed can wash their hands and arms up to the elbows. The udders and teats of the cows should also be washed before milking is commenced.

It is now the practice to have all animals properly groomed before milking. If a cow's flank, tail, or udder is dirty, or perhaps covered with dung, many germs may be added to the milk. It is preferable to tie the cow's tail to her hind leg so as to prevent her from flicking the tail about during the process of milking.

The usual three-legged stool which is used for sitting upon during milking should be scrubbed frequently with hot water and soap, as there is no more fertile source of contamination of the hands, and consequently of the milk, than this article handled in moving from cow to cow.

No person in ill-health, or who is suffering from, or has been in contact with any other person suffering from, any infectious disease, should be allowed to have any connexion whatever with any dairy or cowshed, or with any article used in milk production. It is recommended as a safeguard that, owing to the danger of "carriers" (typhoid carriers, &c.) of disease, the blood of those employed in the dairy or cowshed be taken and examined for Widal's reaction.

All animals should be regularly groomed, exercised and grazed and fed with the best food with a view to obtain milk of the highest quality.

Partially decayed foods cause tainted milk, and food with strong flavours affects the quality of the milk. Very great differences of opinion exist as to the possibility of materially increasing the amounts of fat and solids-not-fat in milk by changes in food, and the results of experiments made with this object in view are conflicting. On the whole, however, it would seem safe to assume that the quality of the milk depends upon the breed of the animal. There is no doubt that the productive capacity of ordinary dairy cows can be very markedly increased by proper care and better feeding. Fresh grass is the natural and best food, hay being the next most suitable. Beets, carrots, and swedes increase the proportion of milk sugar. Cows overfed on cake are liable to give as poor a milk as when underfed. They should be watered from a pure water-supply.

Some breeds of cows yield quantity, others quality. Heavy milkers as a rule give a low percentage of fat and solids-not-fat.

Shorthorn and Red-polled cattle give the most milk. The average capacity of a cow's udder is about five pints, and the average annual yield about 420 gallons.

Dairy cows cannot give a good supply of milk unless they get some exercise, which can easily be provided in pastures during the summer months. Winter exercise is equally as necessary as summer exercise, and the greater prevalence of tuberculosis amongst dairy cows than in beef cattle is probably due to the closer confinement of the milch animals.

Cows are as a rule milked twice daily, the morning milk being greater in amount and poorer in quality, because of the unequal length of time between milking. Young cattle give less milk; they usually become milkers in the third year, and from seven years old give the richest milk. If the cows are frightened, worried or driven about, the quantity and quality of the milk are reduced; if they are kept warm and well-fed the quantity and quality are naturally increased. Where they are continuously exposed in winter, the milk yield may drop 50 per cent.

Existence of Disease Among Cattle.

"If at any time disease exists among the cattle in a dairy or cowshed, or other building or place, the milk of a diseased cow therein: (*a*) shall not be mixed with other milk; (*b*) shall not be sold or used for human food; (*c*) shall not be sold or used for food of swine or other animals unless and until it has been boiled." (Dairies, Cowsheds and Milkshops Order of 1885.)

The undermentioned are the principal infectious diseases which are transmissible from the cow to man: Tuberculosis, anthrax, glanders and farcy, actinomycosis, cowpox, and foot-and-mouth disease.

The cow is liable to certain diseases which may affect man, and some of these may be conveyed by the ingestion of milk containing the specific organisms. The most important disease in milch cows is tuberculosis.

The second interim report of the Royal Commission on Human and Bovine Tuberculosis states that cow's milk containing bovine tubercle is clearly a cause of tuberculosis, and of fatal tuberculosis, in man. It is generally admitted that about 2 per cent of the cows in milking herds in this country have tuberculous udders, and Swithinbank and Newman state that 25 to 30 per cent of milch cows in this country suffer from tuberculosis.

The Board of Agriculture and Fisheries have introduced the

Tuberculosis Order, 1913, made under the Diseases of Animals Acts, 1894 to 1911, which came into force on May 1 of this year, and which provides that "in considering the question of tuberculosis in relation to animals, the fact that the disease is thus communicable to man has a material bearing on the measures to be adopted. Any action which results in the reduction in the number of bovine animals in the country must reduce the risk of the spread of tuberculosis amongst the community, and if it were possible to eradicate from the country the disease in animals, a material step forward would have been taken in the campaign against the disease in man."

This order aims at securing the destruction of every cow found to be suffering from tuberculosis of the udder, or to be giving tuberculous milk, as well as of all bovine animals which are suffering from tuberculosis with emaciation, since these are known to disseminate freely the germs of the disease. It is proposed to give compensation in cases where tuberculosis is found at the post-mortem examination, according to the extent of the disease, but in cases in which the post-mortem examination does not show tuberculosis the compensation for an animal slaughtered is a sum equal to the full value of the animal plus twenty shillings.

By the adoption of this Tuberculosis Order it is hoped gradually to check the spread of tuberculosis in cattle throughout the country.

Outbreaks of sore throat in man have been attributed to the milk of cows suffering from mastitis and diarrhœa.

It is suggested that foot-and-mouth disease, diphtheria and scarlet fever in cows may likewise produce disease in man.

Apart from disease of bovine origin, milk may communicate certain infectious diseases, the specific bacteria of which gain access to the milk after it leaves the udder. For some of these the insanitary conditions which often surround the milk supply are responsible. Epidemics of typhoid fever, scarlet fever, diphtheria, cholera, and probably epidemic diarrhœa have been traced to the milk supply.

Milk Standards.

The Board of Agriculture made the following regulations, which came into operation on September 1, 1901, with reference to milk standards:—

"Where a sample of milk (not being sold as skimmed, separated, or condensed milk) contains less than 3 per cent of milk fat, and 8·5 per cent of milk solids other than milk fat, it shall be presumed

for the purposes of the Sale of Food and Drugs Acts, 1875 to 1899, until the contrary is proved, that the milk is not genuine, by reason of (1) the abstraction therefrom of milk fat or the addition thereto of water; (2) the abstraction therefrom of milk solids other than milk fat, or the addition thereto of water."

Moore and Partridge say: "The above standard of 3 per cent of fat and 8·5 per cent of solids-not-fat we think a low one. There is little doubt that in some quarters an extensive amount of watering down with water or skimmed milk takes place. That this is a profitable proceeding will be evident when it is remembered that 30 per cent of skimmed milk can be added to an ordinary good milk without bringing the fat figure below 3 per cent (Local Government Board standard); as matters are at present there are too many ways of escape for the fraudulent milkman. Milk from single cows is rarely, if ever, met with in commerce, and the poor milk of one cow is not perceptible when mixed with that of the herd. When a purchaser asks for milk he should not be allowed to be served with an inferior product from a diseased or abnormal animal."

The Collection of Milk Samples for Analysis.

The following are the chief points to be noted in taking samples of milk for analytical purposes. It is essential that three samples should be taken and sealed in the presence of the contractor or his agent, in order that if adulteration be detected action can be taken under the Food and Drugs Act. One of the samples taken should be handed over to the contractor or his agent, one kept by the officer taking the sample, and the third sent by registered post or special messenger to the laboratory for analysis. It is necessary that the milk samples should be forwarded for examination at the earliest opportunity, as curdling takes place very rapidly in summer, and directly the milk is at all curdled it is impossible to carry out the examination satisfactorily.

When milk is sampled, it is important to stir up thoroughly the whole quantity contained in the vessel, so as to ensure a complete distribution of the cream throughout the body of the milk. Where no contract exists for the supply of milk the samples must be paid for at the time of purchase. The name and address of the contractor, vendor, &c., and the date of collection must always accompany the samples sent for analysis.

The Interpretation of the Results of the Analysis.

A milk may be adulterated with water, skimmed, or both watered and skimmed; it may also be adulterated in such a manner without

the amount of fat and solids-not-fat falling below the Local Government Board's standards. If the solids-not-fat fall below 8·5 per cent the milk has been adulterated by adding water, and the amount of water added can be found by subtracting the solids-not-fat figure from 8·5, multiplying by 100, and dividing by 8·5; this will give the parts of water that have been added in 100 parts of the milk.

If the fat figure be less than 3 per cent, and the solids-not-fat up to the standard (8·5 or above) the milk has been adulterated by the abstraction of fat, or by adding skimmed milk, which practically amounts to the same thing.

If the amount of fat and solids-not-fat in the sample of milk are both lower than the Local Government Board's standards, the amount of water added should first be found, and a further calculation made to see if the addition of this amount of water would account for the low fat figure. If it does not, the amount of milk deprived of its fat must be determined. Thus, milk samples showing 2·75 per cent of fat and 7·65 per cent solids-not-fat would be returned as containing 10 parts of added water in 100 parts of the milk; but should it contain the same amount of solids-not-fat and 2·4 per cent of fat then it would be returned as containing 10 parts of added water and 10 parts of milk deprived of its fat in 100 parts of the sample of milk.

The variations in composition of the milk from different animals as compared with the average composition of human and cows' milk is shown in the undermentioned table:—

Kind of milk	Water	Total solids	Fat	Sugar	Proteins	Ash	Specific gravity
Human	87·3	12·3	3·4	6·4	1·7	0·2	1031·3
Cow ..	87·6	12·4	3·6	4·8	3·3	0·7	—
Goat ..	86·7	13·3	3·8	4·5	4·1	0·9	—
Ewe ..	75·2	24·8	11·3	3·6	8·8	1·1	1039·3
Ewe ..	81·3	18·7	6·8	4·8	6·3	0·8	—
Ass ..	89·8	10·2	1·2	6·8	1·7	4·5	—
Ass ..	89·6	10·4	1·6	6·1	2·2	0·5	—
Sow ..	89·6	10·4	4·8	3·4	1·3	0·9	—

United Services Medical Society.

The first meeting of the Session 1913-14 was held in the library of the Royal Army Medical College on October 9, 1913.

Colonel Skinner, the President for the Session, gave an address in which he enlarged upon the valuable educational work done by the Society. He pointed out that the discussions were particularly instructive to officers, living in London who had little or no opportunity of working out war problems on manœuvres. He hoped that the study of military medical problems would engage a large portion of their time and thought during the session. He gave a brief sketch of a situation in the battle of Spichern, which he thought illustrated the difficulty of removing a large number of wounded scattered over a broad front, and with an approach to the battle-field by only two bridges at Saarbrucken. He suggested that one of the members should study this battle and read a paper on the medical requirements of the various situations. Colonel Skinner then discussed the medical organization of a division. He thought that the field ambulances might be replaced by one unit organized as a battalion, but having more stretchers and less hospital equipment than the three field ambulances. The ambulance wagons attached to the battalion might be fewer in number than those allotted to the field ambulances and the surplus wagons formed into an ambulance column, which would serve as a connecting link with the clearing hospital.

Lieutenant-Colonel E. M. Wilson then read a paper on the difficulties which have to be overcome in mobilizing medical units. He pointed out that in peace time field medical units are non-existent and have to be formed *de novo* on mobilization, a somewhat difficult matter owing to the number of specially trained men, e.g., operating-room attendants, cooks, nursing orderlies, &c., required for each unit. He strongly advised all medical officers to keep a look-out for promising young soldiers, and to urge them to go in for the examination for promotion and to take out the courses for special appointments. A large number of promotions must be made on mobilization, and a man who has passed the qualifying test is almost certain to get a step; a man who is not qualified at the time of mobilization must be content to remain a private and to see younger soldiers pass over his head. This applied also to men recalled from the reserve.

Clinical and other Notes.

NOTES ON HOSPITAL ADMINISTRATION, JAPANESE ARMY. EXTRACTED FROM REPORTS.

By Captain A. A. MacNEIGHT, I.M.S.

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Infectious Block.—At the entrance to this block there is a shallow box containing a fibre mat, which is kept soaked in cresol solution. Everyone leaving the block rubs his feet on this mat.

The nursing orderlies in this, as in all other wards, always wear white coats while in the wards. Here, in addition, they wear over their mouths white muslin masks, which, when not in use, are kept in formalin solution. After attending to a patient, and before leaving the ward, they wash their hands in corrosive sublimate solution, the rags they wipe them on being at once thrown away.

At present there are six orderlies on duty in this block. Three of them sleep at night in one end of the phthisical ward. In 1911, when the two wards were full of enteric cases, all the orderlies slept in the wards.

The officer who has had charge of this block for the last eighteen months states that during this time there have been no cases of infectious disease contracted in hospital by patients in other wards, or by nursing orderlies.

Pulmonary Tuberculosis.—As soon as tubercle bacilli are found in the sputum of a patient, he is discharged the Service, as unfit to serve again in any capacity, and at once sent to his home. The number of such discharges per annum is said to be about 100. The tuberculin test is largely employed, but little faith is placed in a positive reaction.

All sputum cups in use in this ward, and in other wards those used by patients confined to bed, are attached by means of movable iron arms to the posts at the bedhead, so that they can be used with very little exertion. When sputum is required for examination, a glass tumbler, in addition to the sputum cup, is attached to the bed, and into this nothing but sputum is put.

Disinfection. (*a*) *Of Excreta.*—Enteric patients, even when convalescent, use a bed-pan or commode in the ward instead of going to the latrine. All bed-pans and bed-urinals, as well as sputum cups, are taken, after use, to a special room, where they are emptied into a square concrete tank sunk into the floor; they are then washed at a tap over a sink from which a short pipe leads to the tank in the floor. Every night the depth of the contents of this tank is measured with a stick. The depth found

is compared with a table hung on the wall, giving the quantity of various disinfectants of different strengths to be used according to the depth of the contents of the tank. The amount of disinfectant shown as necessary on this table is run into the tank, and the whole stirred and allowed to stand till morning, when it is let off into a pipe leading to the main drain. The disinfectant used is either 3 per cent carbolic acid or cresol solution.

Soiled wool, gauze, and other things considered likely to block a drain pipe are put into a covered iron receptacle. This is emptied daily into a large incinerator about 100 yards away from the ward. The incinerator is used for destroying rubbish of all sorts, and is lighted at intervals as required.

(*b*) *Of Clothing.*—All clothing is taken away in a special metal-lined, closed handcart to the steam disinfector in another part of the hospital compound, and there disinfected.

(*c*) *Of Documents.*—Case sheets, temperature charts, &c., and any other small articles which have to be taken away from the ward, are first placed overnight in a zinc-lined box, about 1 ft. square and 2 ft. high. Inside this are two perforated trays, and at the bottom a drawer in which is placed a saucer containing formalin solution. As pointed out by the officer in charge of the ward, the disinfection would be more thorough if there were some method of hastening the vaporization of the formalin.

(*d*) *Of Medicine Bottles and Milk Bottles.*—All bottles are sent to the pharmacy in a closed metal handcart. Inside the cart are two horizontal perforated pipes which lead from a screw pipe projecting on the outside, A thermometer is so arranged that the bulb is inside, the scale outside the cart. When the cart is brought to the pharmacy, it is left standing outside while a high-pressure steam pipe is connected. Steam is turned on and kept on until the temperature of the inside of the cart has been raised to 100° C. for half an hour.

All the floors in this block are scrubbed down every morning first with cresol solution and then with hot water.

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Venereal and Skin Disease Block.—A distinguishing mark is worn on the left sleeve by all patients in this block, irrespective of the nature of their disease.

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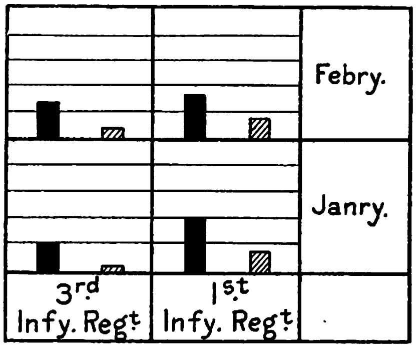
One of the rooms of the block is used as dressing-room and medical officer's room combined. It contains an operating table and a small sterilizer, and is supplied with sterilized dressings, all necessary drugs, a few surgical instruments, douches, syringes, &c.

A chart hanging in the room shows at a glance the number of patients from each unit in the garrison treated in hospital during each month of the year for venereal and skin diseases.

The black columns are for venereal, and the shaded for skin disease cases. The spaces between the horizontal lines each represent five cases, so that according to the diagram below there were in the 1st Infantry Regiment, in January, ten venereal and three skin cases; in February, eight venereal and four skin cases. 3rd Infantry Regiment, in January, five venereal and one skin case; in February, six venereal and two skin cases.



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Salvarsan and Neo-salvarsan.—Syphilis is being treated with neo-salvarsan and mercury.

Gonorrhœa.—The routine treatment consists in washing out the urethra daily with a 2 per cent boric acid solution, followed by the injection of a solution of protargol, beginning with 0·3 per cent and gradually increasing to 1 per cent. The protargol is kept in the urethra for ten minutes.

Another method of treatment which has been under trial for nearly a year past is the local application of heat to the urethral mucosa. The method consists in the introduction of a hollow bougie, the lumen of which is divided so as to allow the flow of fluid up to the tip, and then cause its return. There are two horizontal metal reservoirs of about half a gallon capacity each, arranged one above the other so that their positions can be reversed. These are connected to the bougie by rubber tubing. The upper one is filled with water at a temperature of 131° F. The water flows from this through the bougie and returns to the lower reservoir. This treatment is applied every day for from forty to sixty minutes. Results are very variable, though there have been some rapid recoveries.

The same apparatus as described above was used for about two months in the dressing theatre on a simple sinus in the thigh without the least success.

NOTES OF SOME INTERESTING CASES.

By Captain W. D. C. KELLY.
Royal Army Medical Corps.

The following cases are of considerable professional interest:—

Case I. Sarcoma of Humerus, Berger's Amputation.—Lance-Corporal L. was admitted to the Royal Infirmary, Dublin, on May 26, 1913, with an oblique fracture of the left humerus, about the junction of the middle and upper thirds. The fracture was treated by splinting and extension. An X-ray photograph taken a week later showed the position to be unsatisfactory, and on June 3, 1912, it was wired and put up with a moulded poro-plastic splint. The result was in every way good. On July 16, 1913, the day he was about to be discharged from hospital, he fell down a flight of stone steps and fractured the humerus again. This time the fracture was a transverse one just below the original fracture. He was treated in splints with extension, and the fracture united without trouble in excellent position. He was discharged to six weeks' sick furlough on August 31, 1912.

On return from furlough he reported sick, and was again admitted to hospital. He stated that his arm had done splendidly (he was using 8 lb. dumbbells) until about a fortnight previously, when he noticed that it was getting larger. On examination a hard mass was found round the site of the fracture, which at first was thought to be excessive callus. During the next fortnight the tumour grew rapidly larger, an X-ray photograph showed expansion and complete absorption of that portion of the shaft of humerus involved; sarcoma was diagnosed. Under an anæsthetic a piece of the tumour was removed for microscopic examination, and it was reported to be a pure spindle-celled sarcoma.

On November 20, 1912, Berger's four-quarter amputation was performed in the usual stages. He suffered somewhat from shock, but afterwards recovery was rapid, the wound healed completely by first intention. He was invalided on February 1, 1913. A shoulder pad was fitted, and he was discharged from the Service on March 6, 1913, in good health. He reported on July 4, 1913, at the Queen Alexandra Hospital, London, and had then no sign of recurrence.

The points of interest in connexion with the case are:—

(1) Was the sarcoma present at the time of fracture? Apparently not, because the X-ray plates do not show it, and sarcomata are recognized as a cause of non-union in bone.

(2) The tumour was endosteal and yet spindle celled.

(3) Does the presence of foreign body in bone, such as a wire, predispose to sarcomata?

Case II. Acute Appendicitis, Liver Abscess, Recovery.—Private M. was admitted to the Royal Infirmary, Dublin, as a transfer from Mullingar. He had a history of one week's illness with symptoms typical of acute appendicitis.

On admission he was very definitely tender over the appendix, but as there was no other indication for an immediate operation it was decided to wait and do an interval operation. During the next three days he rapidly improved; the local symptoms disappeared, and the leucocyte count fell from 30,000 to 13,000.

On October 22 he developed acute symptoms, pyrexia, diaphragmatic cough, &c., and signs of consolidation of the right base; the leucocyte count was 18,500, polymorphonuclears, 56 per cent; lymphocytes, 20 per cent; large mononuclears, 23 per cent; and eosinophiles, 1 per cent.

During the next week he went downhill rather rapidly; the temperature chart was of a swinging type, and he complained of diaphragmatic cough and shooting pain in the right side on deep inspiration. All his symptoms pointed to pus somewhere about the liver region.

On October 31 the liver was explored, but no visible pus was found; a plug of material was aspirated, which was found to contain pus cells and staphylococci in pure culture. This established the diagnosis of a septic infection of the liver. Constitutional signs continued, but no further developments took place until November 10, when a dull patch was located over the eighth rib in the mid-axillary line. On exploration pus was found. Next day a portion of the eighth rib was removed in the posterior axillary line, and the diaphragm stitched to the parietes. On November 14 the diaphragm was incised and the liver surface found absolutely free. A soft spot in the liver substance was located into which the finger slipped easily, and about 6 oz. to 8 oz. of pus were evacuated.

His condition for some days was somewhat precarious; he was given large doses subcutaneously of polyvalent anti-staphylococcus serum, and whether as a coincidence or consequence he began to improve. Convalescence was rapid.

He was discharged to sick furlough in perfect health. Up to May 2, 1913, he had not reported sick at his station since his return from sick furlough.

Pylephlebitis is given as a complication of appendicitis in most text-books, but not liver abscess. It is my impression there are only about some dozen recorded cases of recovery in this fortunately rare complication of appendicitis.

I am indebted to Captain C. H. Turner, R.A.M.C., for the final history of these cases, as I handed them over to him on January 3, 1913, on departure for foreign service.

Case III. Multiple Tropical Abscess of Liver.—Private H. was admitted on January 2, 1911, to Portobello Hospital, Dublin, for anæmia, wasting, and fever; he was transferred to Royal Infirmary on January 7, 1911. I saw him on January 11, 1911.

Previous History.—He had done two tours of foreign service in India, six years and eleven years with one year between. He never had

dysentery. He stated that he felt ill before embarking for home in October, 1910, but was afraid to report sick as he thought it probable that he would not be allowed to embark. He owned to being a moderate beer-drinker. He was on furlough during November and December, and reported sick on return to his regiment.

When I first saw him he had been in hospital nine days, his temperature was of the hectic type, he looked ill, the complexion was muddy, there was much emaciation, and the abdomen was large and prominent. He presented a perfect picture of portal obstruction. The liver was much enlarged, the spleen was swollen, and he was suffering from diarrhœa. Hæmorrhoids were present, and there were large veins running over the surface of the abdomen on to the thorax; the abdomen contained free fluid, the heart was displaced upwards and to the left, the urine was normal.

At the time I expressed an opinion that it was a case of portal obstruction and hypertrophic cirrhosis of the liver. A week later I was asked to see him again, as he had developed a tender spot in the epigastrium. His breathing was distressed; paracentesis abdominis was at once performed and 30 oz. of ascitic fluid were drawn off. The left lobe of the liver was explored with an ordinary exploring needle and pus found. The diagnosis of liver abscess was established. Leucocyte count 18,000.

Next day the abdomen was opened in the middle line. The liver was found adherent to the anterior abdominal wall, and it was stitched to the parietes, incised, and an enormous quantity of pus evacuated from the left lobe, and a large drainage tube inserted. For the next few days he improved and seemed much relieved. After this he became worse, cardiac failure and general anasarca, together with suppression of urine, occurred; he was treated in the usual way and rallied. The right lobe of the liver remained large. On the 27th it was explored, pus was found and 90 oz. evacuated by aspiration; the cavity was injected with quinine solution, as recommended by Rogers. He at once improved, the general anasarca disappeared, the peritoneal fluid was absorbed, the secretion of urine increased in quantity, and the heart came back to normal position. By February 4 the right lobe of the liver was again as big as before: he was given 20 gr. of ipecacuanha in keratin-coated pills for three evenings in succession. On February 7 the right lobe was aspirated and 90 oz. of pus again evacuated.

Up to this time the sinus from the left lobe was discharging freely; on culture of the pus it was found to be infected with staphylococci.

From this date the change in his condition was wonderful; the temperature was normal, the blood count became normal in thirty-six hours after aspiration, the sinus dried up like turning water off at a tap, in spite of its having been infected with septic organisms. He left hospital on March 5, having put on 1½ st. in weight.

Remarks.—Perhaps I ought to apologize to the readers of the Journal

OF THE ROYAL ARMY MEDICAL CORPS for publishing a case of tropical abscess of the liver. I have done it for one reason only, to illustrate by an extreme case the value of ipecacuanha in tropical liver abscess. When I say ipecacuanha I mean either the fresh powder or the more active preparation, emetine hydrochloride.

We have all heard of the treatment by ipecacuanha of the presuppurative stage of amœbic hepatitis; unfortunately, in a great many cases this stage is never sufficiently acute to make them report sick, just as they never have acute intestinal signs of amœbic infection.

The particular case before us never reported sick until he had two enormous abscesses; there was no history of dysentery or even of diarrhœa.

Captain C. H. Turner, R.A.M.C., treated thirty-five cases of liver abscess in India by the open operation and ipecacuanha; there was only one death, the first case, to which he gave no ipecacuanha. I saw a reservist in Dublin, a huge-framed man, reduced to a skeleton, coughing up two pints of liver pus daily. He was given emetine hydrochloride, and in four days his cough was dry. Since I started using ipecacuanha in these cases I have not lost one. It is not necessary to do the open operation except in cases of left lobe abscess, pointing in the middle line; here one would be afraid of adhesions being torn through after aspiration and pus escaping into the general peritoneal cavity. It is quite possible that in small abscess cases difficult to hit off with the needle ipecacuanha will effect a cure. On looking up the last two Army Medical Reports I find the death-rate for liver abscess to be 50 per cent. If these were all tropical abscesses I cannot help thinking that this is 50 per cent too high. Emetine hydrochloride should, of course, always be given, because it is so much more active and more easily tolerated; and also because the possibility of the powdered ipecacuanha not being fresh is eliminated.

Case IV. Inoperable Sarcoma of the Right Iliac Fossa. Treated by Coley's fluid; recovery.

I regret I have no detailed notes of this case, and must give it from memory. A bombardier in the R.H.A., stationed at Newbridge, was admitted to the Military Hospital, Curragh, in August, 1910, with the following history:—

While at gymnasium he felt a pain in the right iliac fossa; at the time he did not take any notice of it. Afterwards, however, while palpating the part he detected a lump about the size of an orange, reported sick, and was admitted to hospital. The lump grew rapidly. An exploratory laparotomy was done and a tumour growing from the right iliac fossa exposed; on cutting into it, it was found to be solid and very vascular, resembling a sarcoma to the naked eye. With great difficulty the bleeding was stopped and the wound stitched up. Unfortunately, no piece was removed from the tumour for microscopic examination.

In October he was transferred to the Royal Military Infirmary, Dublin, where he came under my care. On admission a solid mass could be felt filling up the whole right iliac fossa and extending across the middle line. Injections of Coley's fluid, commencing with ½ ♏ doses given subcutaneously, were at once given; the maximum dose which could be tolerated was 2 ♏. After the first week the injections were given into the tumour. In all he had seventy-seven injections, and ultimately the tumour disappeared. It was found necessary to give the injections for about ten days, followed by a week's interval. I had an opportunity of seeing this man some nine months afterwards at Aldershot. He was then in excellent health and doing full duty.

THE RADICAL CURE OF SACCULAR INGUINAL HERNIA.

By Major E. E. ELLERY.
Royal Army Medical Corps.

The fact that the operations described for the radical cure of this form of hernia are very many and of great ingenuity and variety, and that they all possess the common factor of some form of sac obliteration, rather tends to suggest that this part of the operation is the essential thing and that the method of completing it is comparatively unimportant.

Now Bassini's operation, or some slight modification of it, is still largely done in the Service, and the object of this short paper is an attempt to show that the muscle-suturing part of this procedure is unnecessary and harmful, and that it involves a longer operation and a longer convalescence.

When we consider the conditions under which hernia is prevented from occurring in the ordinary way during increased intra-abdominal pressure we have a mental picture of a fixed diaphragm, contraction of the abdominal muscle, straightening of the curved lower border of the transversalis and internal oblique, close approximation of these to Poupart's ligament, and automatic closure of a possible exit which, owing to position and structure, is the weakest part of the abdominal wall. The above action is helped by flat pressure from the external oblique aponeurosis.

We are thus forced to the conclusion that the integrity and free action of the lower fibres of the transversalis and internal oblique are essential in the prevention of hernia from the normal abdomen, and when a sac has been tied and reduced and normal conditions thus obtained, common sense suggests that the less this important bundle of muscle fibres is interfered with, and the sooner it is freely working again, the better.

Why then anchor it down to a nearly rigid structure? Why alter the natural function of the part? Is not Nature's method good enough? Moreover the muscle cannot stay permanently where it is sutured unless

it becomes paralysed and useless. It must either resume its function by breaking away from its sutures or do what all muscle does when its action is in abeyance—become weak and wasted.

I have often heard men say, "See what a gap you find between the internal oblique and Poupart's ligament when operating." The explanation, of course, is that the patient is recumbent and the abdominal muscles are completely relaxed by an anæsthetic. If a normal person lies down and draws up his knees and rests them so, he can easily insert his fingers under the internal oblique, but if he contracts his abdominal muscles forcibly, a very complete closure of the inguinal canal can be demonstrated.

Unless there is an abnormal musculature, which is uncommon, the "gap" is of no importance because a hernia does not recur if the sac be tied high up and reduced.

So far, common sense and non-interference with a natural function seem to be in favour of the argument against Bassini's operation, but there are many other reasons for a mere ligation of the sac—the quicker and simpler operation, and the uniformly satisfactory results (as long as asepsis is maintained), combined with a very much shorter convalescence.

The long period during which a man is unfit for duty after Bassini's operation is in all probability due to the time required by the sutured and injured muscle to shake itself free from its shackles and recover its vitality and function, but if Nature's method of preventing a hernia is left intact it is difficult to see any reason for a prolonged after-treatment.

For five years I have performed a single ligation of the sac high up and reduction of the stump within the abdomen to cure an inguinal hernia, and have had no cases of recurrence as far as I know.

I now get the patient up ten days after operation and discharge him from hospital eleven days later, and he is fit for duty at the end of a month's complete treatment. I think that even this period might be reduced with advantage.

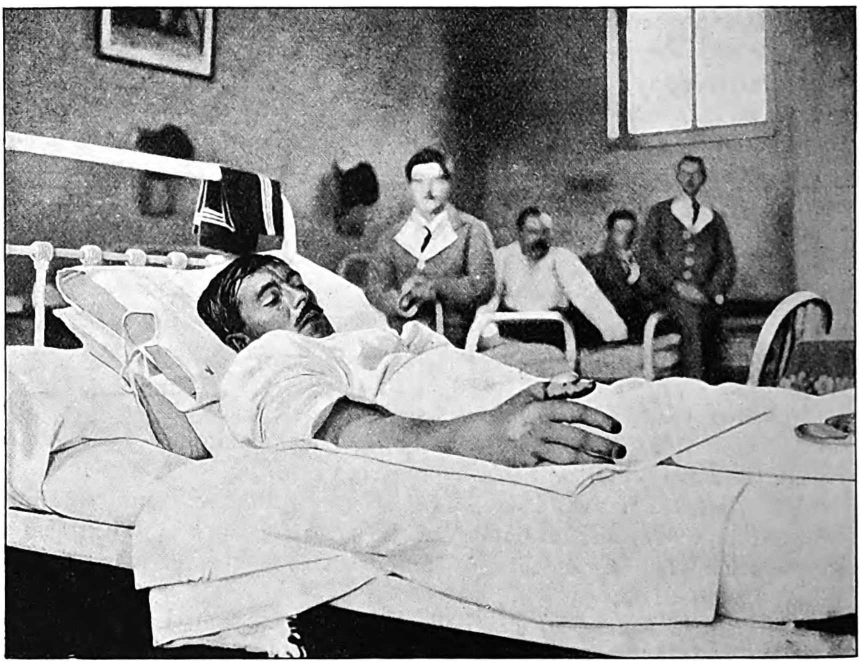
There is, of course, no claim for any novelty in this contribution as the simple procedure of sac ligation is coming more and more into favour with surgeons at the present day, and the fact that they find it uniformly satisfactory shows that Bassini's method and its modifications involve an unnecessary disturbance of anatomical structures and an unnecessarily long convalescence; in fact, it is out of date.

To conclude: The best operation for the radical cure of a saccular hernia is the quickest and most simple one. What a relief it will be to the student when the various and more or less complicated methods at present described are deleted from the textbooks.

A CASE OF SNAKE-BITE.

By Major R. W. H. JACKSON.
Royal Army Medical Corps (Retired Pay).

No. 24048, Gunner K., was admitted to the military hospital, Weymouth, on June 30, 1913, with urgent symptoms of snake-poisoning which had commenced five or ten minutes after he had been struck by a brown adder in the right thumb close to the terminal joint. This occurred at Upton Battery while he was standing near an emplacement and attempted to rest his hand on a sloping grass-covered parapet within the fortress. At once the hand and arm started swelling, accompanied by



darting pains towards the axilla and a feeling of faintness. Within a quarter of an hour he began to vomit and purge, he was conveyed in a taxi-cab to this hospital (7 miles), and was seen by Major J. Presscott and myself, within an hour after the injury. He showed all the symptoms of acute collapse; slow, sighing, irregular respiration, weak, quick, irregular pulse, temperature 95° F., pallid sweating skin. (On becoming conscious, there were frequent attacks of vomiting and purging, and the eyes were congested, with conjunctivæ jaundiced.) The local physical signs and symptoms were well marked; there were two small blisters at

the site of entrance of the snake's fangs, the hand and forearm were much swollen and he complained of intense pain in the upper arm and axilla with cardiac distress which caused him to knock on his chest with his fist and breathe deeply. The tongue was slightly furred. The limb had been tightly bandaged at the wrist, at the elbow, and above at the middle of the upper arm.

Before my arrival a dose of brandy had been administered and he had been put to bed. As no anti-venom serum was procurable, I injected 20 minims of a strong solution of potassium permanganate into each of the points of penetration of the fangs, and administered 3 drams of aromatic spirits of ammonia, and then gradually unfastened the tight constrictions which had considerably impeded the circulation of the hand and forearm. With each loosening of the bandages the symptoms already described became more urgent. The arm was then immersed in a hot-water arm bath. By degrees the very acute symptoms subsided and complete consciousness soon returned.

The temperature at night was 100° F., pulse 104 regular, respiration normal. He was ordered milk diet and soda, with brandy if required, a strychnine tonic mixture and a sleeping draught. The arm bath was continued. His recovery was uneventful, and he was discharged from hospital to proceed on a month's sick furlough on July 24, 1913.

The swelling of the hand and arm was due to the action of the venom on the capillaries in the vicinity of the bite; the weak and irregular action of the heart was due to the specific effect of viper-venom on the tissues of the heart. A larger dose would have killed the patient by syncope.

After recovery from the first acute symptoms, what the patient had to contend with was the danger of sloughing of the tissues of the bitten limb on account of the local action of the venom. It is this local action which is the troublesome symptom following a non-lethal dose of venom from snakes belonging to the Viperidæ class; but in the colubrine class of poisonous snakes it is not such a prominent symptom.

Report.

REPORT ON SOME OBSERVATIONS MADE AND WORK DONE AT THE PASTEUR INSTITUTE, TUNIS.[1]

By Captain A. C. H. GRAY.
Royal Army Medical Corps.

The town of Tunis, the capital of Tunisia, is easily reached from Marseilles by the "Transatlantique" line of steamers. Passenger steamers leave Marseilles harbour every Monday and Wednesday at midday. The journey lasts thirty-two hours.

The Pasteur Institute of Tunis is situated at the northern extremity of the town, opposite the Belvedere Gardens. A tram from the centre of the town takes one to the door of the Institute, the journey taking a quarter of an hour.

The principal building contains a large general laboratory for the preparation of culture media, &c., separate laboratories for the director and his staff, hot and cold incubating rooms, a waiting-room, and an inoculating-room for those attending for anti-rabic inoculation, and also a large library. In the basement of the building are laboratories for the preparation of the anti-rabic injections and a warm room in which the spinal cords are dried.

A large single-storied annexe contains a laboratory for the preparation of calf lymph and stabling for the calves. In this building are housed all the experimental animals, chimpanzees, monkeys, dogs, rabbits and guinea-pigs; it stands in the grounds of the Institute some fifty yards away from the principal building.

As the Institute is situated more than a mile and a half from the centre of the town, a bureau has been established in the town, to which the public can bring products for analysis, &c., and where serums and vaccines made at the Institute can be bought.

The principal departments of the Institute are:—

(1) For the preventive treatment of rabies.

(2) For the preparation and distribution of calf lymph. About 50,000 doses are distributed every year, and, in addition any person, who wishes it, can be vaccinated at the Institute free of charge.

(3) For the chemical analysis and microscopical examination of products and pathological material.

(4) The fermentation department for the distribution of selected yeasts.

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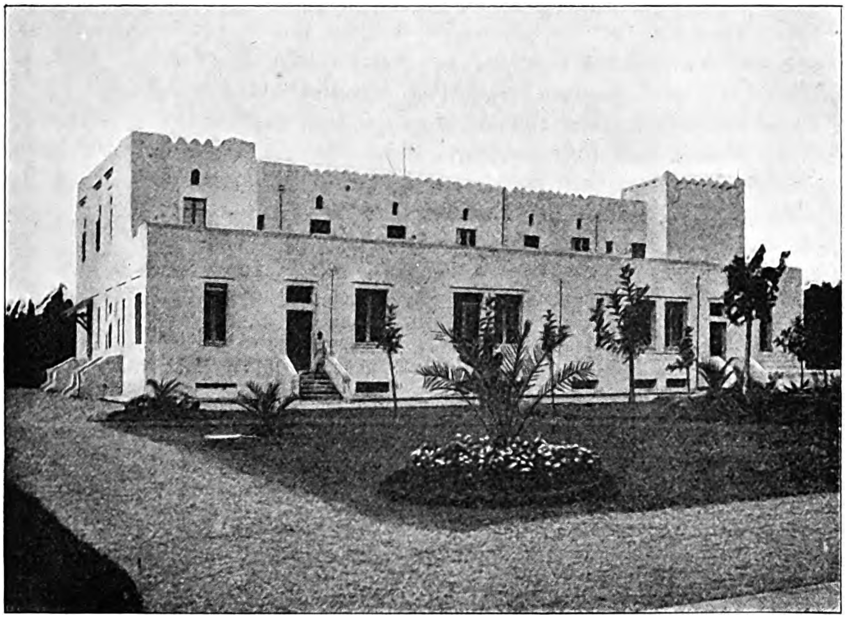
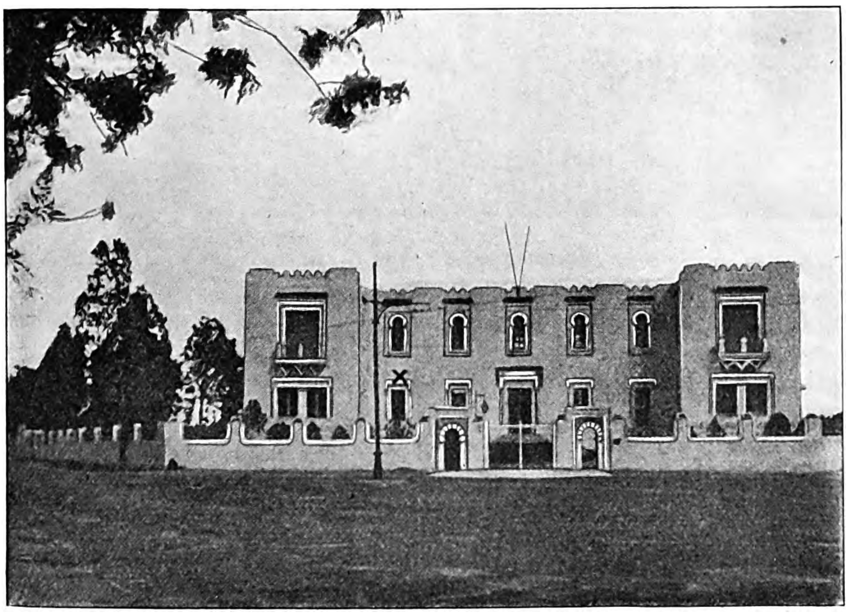
[1] Published by the permission of the Director of the Pasteur Institute, Tunis.



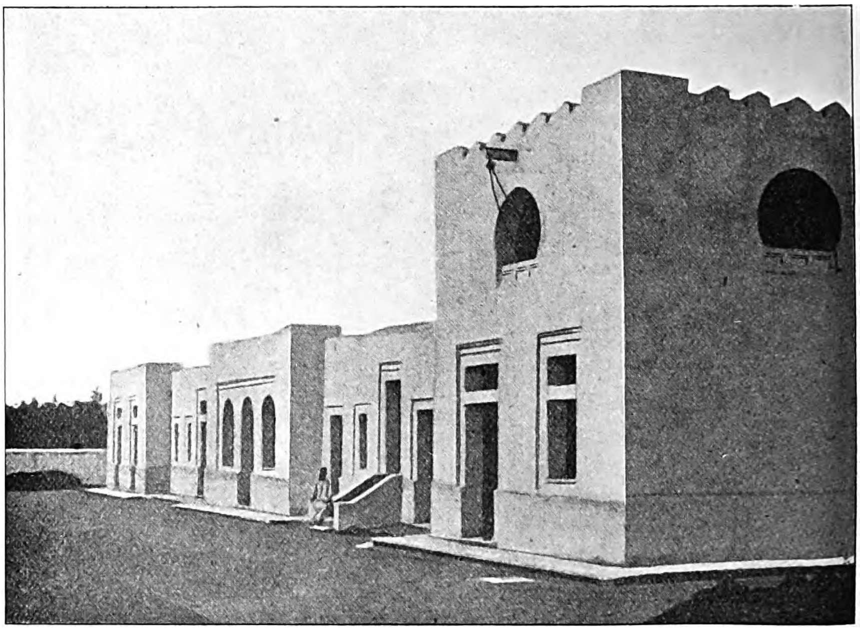
Pasteur Institute, Tunis (from the Grounds).



Pasteur Institute, Tunis (from the Road).

Other vaccines, such as tuberculin, mallein, and symptomatic anthrax vaccine, not made at the Institute, are distributed to the public. Medical leaflets on the local diseases are written and distributed broadcast.

In addition to all the routine work of the Institute, the Director, Dr. Ch. Nicolle, and his assistants, find time for research work on a large scale, and it is this work which has given the Institute its world-wide reputation.



Pasteur Institute, Tunis. Annexe.

It would be difficult for me to exaggerate the kindness with which I was received at the Institute. A special laboratory was put at my entire disposal, an attendant was told off to help me in the post-mortem examination of the dogs. Everybody, from the Director downwards, went out of his way to show and explain things to me, and it was with feelings of genuine regret that I said good-bye when my two months were over.

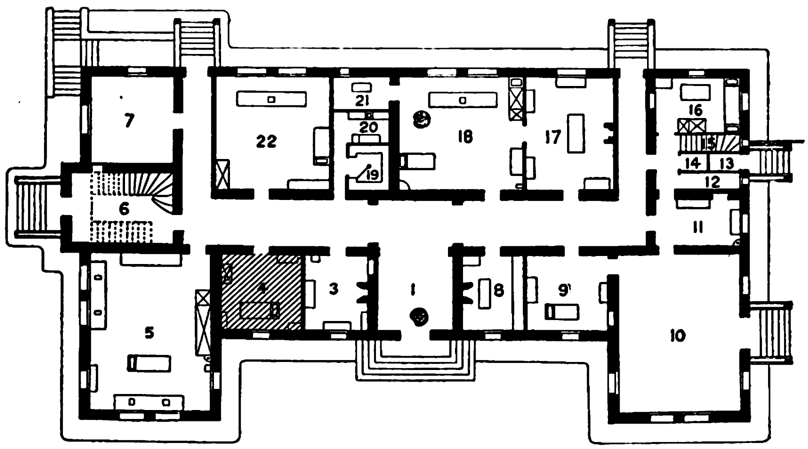
Preventive Treatment of Rabies.

The preventive treatment of rabies was of great interest to me, as I had never seen anything of the kind before. This is really the main work of the Institute and the whole of the basement of the building is given up to it. Through the kindness of the Director, Dr. Ch. Nicolle,

I was allowed, after learning the methods, to perform autopsies and prepare the injections myself.

Calmette's modification of Pasteur's original method, i.e., the use of glycerinated spinal cord, is the one used.

Rabies is still of frequent occurrence among the dogs of Tunis. Preventive treatment was started on January 1, 1905, and more than two thousand patients were treated at the Institute in the first year. All stray dogs in Tunis are captured and destroyed, the local police being very vigilant in this respect. All dogs without collars are caught and



Ground Plan of the Institute: (1) entrance hall; (2) vestibule; (3) secretary's office; (4) *laboratory placed at my disposal;* (5) general laboratory; (6) private staircase; (7) library; (8, 9) private laboratories; (10) waiting-room for patients for anti-rabic inoculation; (11) inoculation room; (12, 13, 14) lavatories; (16) chemical laboratory; (17) director's office; (18) director's laboratory; (19) incubating room (at 37° C.); (20) cool incubating room; (21) inoculating room; (22) laboratory for the study of fermentation.

taken to the Municipal Fourrière. If not claimed by their owners within a week, they are destroyed in a lethal chamber with coal gas. In this way about a thousand stray dogs are got rid of every year.

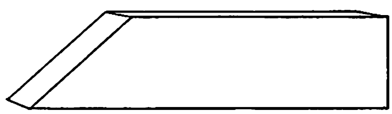
The rabbits used for inoculation are specially selected for their large size, and are kept under observation for a month to ensure that they are in good health. Three or four rabbits are inoculated at a time. The inoculated rabbits die of rabies on the eighth day.

Inoculation of Rabbits.—The operation of inoculation is simple and is performed as follows: The fur over the cranium is cut, the skin is shaved and painted with tincture of iodine. A longitudinal incision, 1 in. long, is made in the middle line of the skull, down to the bone. The two sides of the incision are separated and kept apart with an eye

speculum. A small trephine, of the diameter of an ordinary lead pencil, is then applied just to one side of the median line, in order to avoid the longitudinal sinus, and the disk of bone removed. Two or three drops of an emulsion of the glycerinated brain (fixed virus) of a rabbit dead of rabies are then inoculated with a hypodermic syringe under the dura mater. The wound is then closed, sewn up with three silk sutures, and flooded with weak carbolic lotion. After inoculation the rabbits are placed in separate cages in a special room. For the first three days the rabbits feed well and seem none the worse. On the fourth day they cease to feed, and when taken out of their cages and placed on the ground sit still or only move very slowly. On the sixth day the paralysis is marked. On the eighth day the rabbits die.

Autopsy on the Rabbits.—The autopsies are performed directly after death in a special room. Each rabbit is stretched out, back uppermost, on a large paper-lined tray over a block of wood.

This block of wood supports the abdomen. The legs are stretched down the inclined plane of one end and the head well flexed over the other rectangular end. The ears are first cut off. The rabbit is

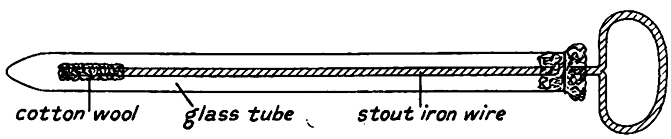


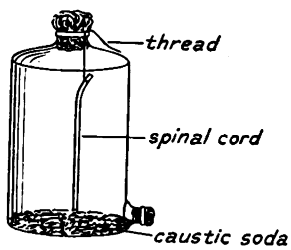
Wooden Block.

then slit all the way up from nose to tail with scissors and the skin reflected. The whole rabbit is then well flooded with boiling water from a saucepan. The vault of the skull is next removed with sterile bone forceps. The exposed dura mater is examined at the site of the previous inoculation, and if any inflammation is discovered the animal is rejected. The dura mater is then reflected, the medulla is cut through, and the brain removed. The brain is placed in glycerine, in a sterile wide-mouthed bottle. The brain is never used for anti-rabic inoculation, but is used to infect rabbits. The bottle is at once labelled, dated, and covered with a cone of paper. The method of removing the spinal cord is very ingenious. A sterile ramrod is introduced into the vertebral canal at the lumbar end and pushed up the whole length of the canal. The spinal cord emerges from the cervical end of the vertebral canal, as the ramrod is pushed up, and is caught on a piece of four-fold sterile blotting paper, which has been previously placed under the end of the cervical vertebral column. The ramrod is made of stout steel wire—a spoke from the wheel of a motor bicycle answers very well—on to one end of it a handle is soldered, the other end is covered with cotton wool and bound round with thread, in order to fit closely the bore

of the vertebral canal. The ramrod is then placed inside a stout glass tube and sterilized.

The sterile blotting paper with the spinal cord in its folds is then removed. One end of the cord is seized with sterile forceps and drawn through a loop of sterile thread. The knot is pulled tight and the cord, held up by the thread, is cut in half with sterile scissors. The half cord is then lowered into a large bottle, the bottom of which is covered with sticks of caustic soda. The neck of the bottle is plugged with cotton wool. This plug holds the thread in place so that the half cord is suspended inside the bottle, just not touching the sticks of caustic.





The other half of the spinal cord is treated in just the same way and is put into a second bottle. A small fragment is snipped off from this half of the cord and is put into a tube of broth and incubated. Should any growth result the whole cord is rejected. Six bottles, each containing half the spinal cord of a rabbit, are then placed on a shelf in a special room, kept at 22° C. The bottles are placed in line on the shelf and a registering thermometer is placed between the third and fourth bottles.

The dry cords are removed from their bottles and placed in glycerine on either the second, third or fourth day, according to which cord is required. No cord of greater age than four days is used at the Institute. The glycerine immediately fixes the virus. The cutting up of the cords is performed as follows: A pair of small, sharp-pointed scissors is heated in a bunsen flame until the blades are red hot. These are allowed to cool. A cord is then removed from the bottle by the thread and passed through the flame quickly once or twice. The cord is then held over a small sterile bottle containing glycerine and pieces snipped off it with the scissors. Each piece, as it is snipped off, falls into the glycerine.

Pieces sufficient for ten doses are cut off at a time, 2 mm. of cord being allowed for each dose. The dry cord varies a good deal in thickness, but the operator through long practice is able to judge the requisite quantity. The bottle containing the cut up cord from one rabbit is then stoppered, flamed, labelled, and covered with a cone of paper. The bottles containing the pieces of cord are kept in an ice-chest. The cord is kept for at least ten days in the glycerine before being used, and will retain its full potency for several months. Enough material is always kept at the Institute to treat a hundred patients.

The injections are prepared just before use. A list of the number of injections of the first (or fixed virus), second, third, and fourth day cords is made out each morning. The weakest injection is prepared first. The right number of pieces of cord are removed from the bottle with sterile forceps and are put into a sterile glass measure, the bottom of which is of ground glass. The cord is then mashed up with a sterile glass rod. After a thorough mashing, sterile saline is added, a few drops at a time. When thoroughly emulsified, the total bulk of fluid is added, allowing 5 c.c. of saline for each injection, so that if enough cord for twenty people

Wooden Piston kept in Iodine Bottle.

had been taken from the bottle, the emulsion would be made up to a bulk of 100 c.c. Each strength of spinal cord is emulsified in this way.

The patients attend at the Institute for their injections at 8.30 in the morning. First come those who are to have the mildest injections (i.e., fourth day cord). A 10 c.c. glass syringe, fitted with an expanding rubber piston, is used. The needle is of steel, short and rather stout, and is kept very sharp. The syringe is sterilized, before use, by boiling. The emulsion is drawn up into the syringe to the 5 c.c. mark. The patient's flank is exposed and a dab of iodine is applied with a wooden piston.

The needle is inserted through the dab of iodine and the injection given subcutaneously. The needle is then withdrawn and a fragment of cotton wool pressed over the spot. The syringe is sterilized once for each series of injections. Between each injection the needle is dipped into a pot of boiling boracic solution.

Two methods of dosage are used at the Institute: (1) Ordinary; (2) intensive.

In both systems one dose only is given daily. The amount of cord given is always the same. The injection is always of 5 c.c. bulk.

Ordinary.

November 1	4 day cord	November 12	4 day cord
,, 2	4 ,, ,,	,, 13	3 ,, ,,
,, 3	3 ,, ,,	,, 14	3 ,, ,,
,, 4	3 ,, ,,	,, 15	2 ,, ,,
,, 5	4 ,, ,,	,, 16	2 ,, ,,
,, 6	4 ,, ,,	,, 17	No injection
,, 7	3 ,, ,,	,, 18	4 day cord
,, 8	3 ,, ,,	,, 19	3 ,, ,,
,, 9	2 ,, ,,	,, 20	3 ,, ,,
,, 10	2 ,, ,,	,, 21	2 ,, ,,
,, 11	No injection	,, 22	Fixed virus

Twenty injections are thus given, the course lasting twenty-two days.

Intensive.

November 1	4 day cord	November 18	4 day cord
,, 2	4 ,, ,,	,, 19	3 ,, ,,
,, 3	3 ,, ,,	,, 20	3 ,, ,,
,, 4	3 ,, ,,	,, 21	2 ,, ,,
,, 5	4 ,, ,,	,, 22	Fixed virus
,, 6	4 ,, ,,	,, 23	
,, 7	3 ,, ,,	,, 24	
,, 8	3 ,, ,,	,, 25	No injection
,, 9	2 ,, ,,	,, 26	
,, 10	Fixed virus	,, 27	
,, 11	No injection	,, 28	
,, 12	4 day cord	,, 29	4 day cord
,, 13	3 ,, ,,	,, 30	3 ,, ,,
,, 14	3 ,, ,,	December 1	3 ,, ,,
,, 15	2 ,, ,,	,, 2	2 ,, ,,
,, 16	Fixed virus	,, 3	Fixed virus
,, 17	No injection		

Twenty-five injections are thus given in thirty-three days. The intensive treatment is used for: Bites on the face; deep and penetrating bites; and for those cases in which treatment has been delayed. In all other cases the ordinary treatment is used.

Treatment of Gonorrhœa at the Pasteur Institute, Tunis.

Dr. L. Blaizot, Chief of the Laboratory at the Pasteur Institute, Tunis, was kind enough to demonstrate to me his method of treating gonorrhœa. This method is a combination of vaccine treatment with ordinary irrigation. For irrigation, either physiological saline or a weak solution of potassium permanganate is used.

The vaccine is prepared as follows on a special medium: 500 grm. of fresh minced beef are allowed to soak all night in a litre of water at a temperature of 37° C. Next morning the broth is filtered, made

up to the original bulk and neutralized with normal soda solution, litmus being used as the indicator; 7 c.c. of normal soda solution are added to the whole bulk of the broth. To this alkaline broth, 15 grm. of agar and 5 grm. of sodium chloride are now added. The medium is cleared and filtered and is ready for tubing. Each tube contains 5 c.c. of the medium.

A dozen tubes, prepared in the above way, are first taken, melted and allowed to cool down to 60° C.; 10 c.c. of blood are then removed from the vein of a patient, the blood being taken straight into a 10 c.c. syringe. When the syringe is quite full of blood, the needle is quickly removed from the syringe and the blood distributed among the twelve tubes, each tube receiving rather less than a cubic centimetre. As each tube receives its blood, it is rapidly rolled by an assistant, to mix the blood and medium thoroughly, and is then immediately placed in a sloping position. The tubes are not touched for twenty-four hours. At the end of this time they are incubated for a further twenty-four hours, to ensure their sterility, and are then ready for use.

Dr. Blaizot considers that the above medium is the best for the culture of the gonococcus, but as he sometimes finds a difficulty in obtaining fresh human blood in sufficient quantity, he uses the following alternative medium for subculture.

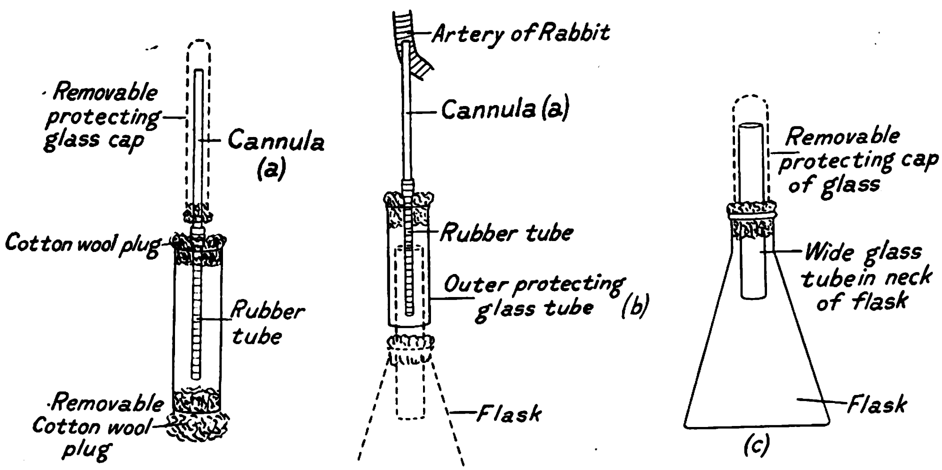
This medium is prepared as follows: The alkaline agar tubes are prepared just as in the former case, and after sterilization are sloped. Dr. Blaizot lays great stress on having the tubes as moist as possible, and to ensure this the tubes are left to cool in the sterilizer, and are only removed and sloped at the very last moment before the agar sets. Half a cubic centimetre of fresh rabbit serum is run on to the surface of each agar slope. The tubes are then inclined backwards and forwards until the serum has wetted the whole surface of the agar. The tubes are allowed to rest in the sloping position for three days, so that the serum shall set firmly on the surface of the agar. The tubes are then ready for use.

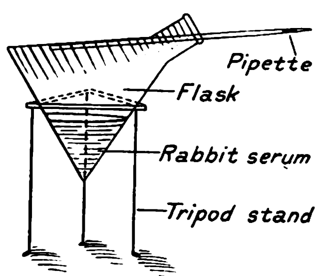
To obtain the rabbit serum, the carotid artery of a large rabbit is exposed, a piece of gutta-percha tissue is slipped under the artery which is then painted with tincture of iodine. The artery is ligatured above, a loose ligature is slipped under it below, and a temporary clip applied. The artery is then opened between the clip and the top ligature, and the cannula (*a*) slipped in and tied in position by tightening the loose ligature already applied.

The cannula has a short length of rubber tubing attached to it and this tubing is protected from contamination by a glass tube (*b*) of $\frac{3}{4}$ in. diameter. A sterile Erlenmeyer flask (*c*), fitted with a glass tube of slightly smaller bore than that which surrounds the rubber tube attached to the cannula, is prepared previously. This flask is now taken, the glass tube fitted into its neck is slipped over the rubber tube attached to

the cannula, and inside the tube which protects it (see middle figure below). The clip is then removed from the artery, and the blood runs at once straight to the bottom of the flask. When as much blood has been collected as possible, the flask is removed, flamed, plugged, and put aside in the cool for at least twenty-four hours to allow the serum to separate from the clot.

The tubes are prepared by sucking up the serum into a pipette and just blowing it out on to the surface of the agar slopes. In the interval





taken up by plugging, flaming, and replacing each tube the pipette rests in the flask, as shown in the diagram.

The original growth from the gonorrhœal pus is obtained on the human blood tubes, and subcultures are made from this on to the rabbit serum tubes. The growth is emulsified in the ordinary way with saline and the emulsion then placed in centrifuge tubes and centrifuged. Dr. Blaizot lays stress on the thorough washing of the gonococci. After the initial washing, the supernatant saline is removed, some more saline is

added and the vaccine thoroughly shaken. This thick emulsion is then counted.

Dr. Blaizot gives his vaccine intravenously, the gonococci being suspended in 5 c.c. of physiological glucose solution, which is injected straight into the median basilic vein with a syringe.

In ordinary cases a dose of fifty million gonococci is given. The few drops of thick gonococcal emulsion containing these fifty million gonococci are added to the 5 c.c. of glucose solution, well mixed and injected. At present Dr. Blaizot is injecting living vaccines; when he began this intravenous treatment, he first killed the gonococci by exposing them to a temperature of 55° C. for ten minutes.

Up to the present Dr. Blaizot has not treated on these lines, any of his patients with an "autogenous" vaccine, though he intends to do so, commencing with a very much smaller dose.

Dr. Blaizot is using for his intravenous injections a strain of gonococci which has been attenuated by many generations of subculture; this, combined with the fact that he only injects washed cocci, may account for the small reaction after so large a dose.

The immediate results of the vaccine are a sharp rise of temperature which lasts a few hours, and the next day a marked increase in the amount of the urethral discharge. Dr. Blaizot will publish his results shortly and gave me to understand that he was well pleased with the treatment.[1]

Bouton d'Orient.

Bouton d'Orient does not occur in the town of Tunis, but, I was informed, it is common at Gafsa, some 200 miles to the south.

While I was at the Institute, a French gentleman who lived at Gafsa, came to consult Dr. Nicolle for a small papule on his hand. This papule was situated on the back of the hand, exactly over the base of the first metacarpal bone, and very much resembled a nodule of lupus. The papule was raised from the surrounding skin, felt hard, and could have been entirely covered by a threepenny piece. I was considerably surprised when Dr. Nicolle told me that this was a case of Bouton d'Orient, but the microscope soon proved the truth of the diagnosis. I then watched Dr. Nicolle make a culture from the papule. The requirements were all to hand. They consisted of a lighted bunsen burner, a pot of tincture of iodine, a dry sterile hypodermic syringe fitted with a new fine steel needle, and a tube of the N.N.N. medium The "Bouton" and the surrounding skin were first painted with iodine over an area the size of a

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[1] Dr. Blaizot informs me that this method has recently been modified; the newer one gives better results and the patient has no reaction of any kind. (*Comptes-rendus de l'Académie des Sciences*, October, 1918.)

five shilling piece. This was allowed to dry and the painting repeated. When the second coat of iodine had dried, the needle (attached to the syringe) was passed through the flame once and then introduced through the skin just outside the edge of the papule. The needle was then pushed on well under the middle of the "Bouton" and the point gently moved about. Suction was then made by drawing the piston half way out of the syringe. Keeping the piston in this position, the syringe was removed and the needle at once plunged under the surface of the fluid in the culture tube which was tilted by an assistant. The piston of the syringe was then drawn out to the full extent so that the fluid from the culture tube ran up into the barrel of the syringe, carrying with it any material which had been sucked from the "Bouton." After gentle agitation in the barrel of the syringe the contents were squirted back into the culture tube, the mouth of the tube was flamed, the plug replaced, and the operation was complete.

The "Bouton" was dressed by placing a large single crystal of potassium permanganate over the centre of the papule; this was covered with a pad of wool and the dressing kept in place with a piece of strapping. This dressing was kept on until the next morning, when a simple one was substituted. The patient assured me that the treatment was not particularly painful.

Preparation of the N.N.N. Medium.—This medium, which is a modified form of Novy and MacNeal's blood agar, is now so well known that it seems but a waste of time to further describe it. As, however, I had the opportunity of watching Dr. Nicolle himself prepare this medium, I will make a few remarks on what I saw.

The basis of the medium is simply agar, salt and water in the following proportion:—

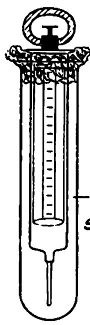
Agar	14 grm.
Salt	6 ,,
Distilled water	900 c.c.

The agar and water are allowed to soak together all night, the salt is then added, the mixture is dissolved by heat, filtered and tubed, about 5 c.c. of medium being run into each tube. No neutralization or standardization of the medium is necessary. The tubes are sterilized and stored, and are then ready for the final process. To complete the process twenty tubes are taken, placed in a wire rack, and the agar melted by placing the rack of tubes in a large saucepan of boiling water. After the medium has melted, sufficient cold water is added to the saucepan to bring the temperature of the water down to 55° C., and in about five minutes' time the blood may be added. A large rabbit is now brought into the room, extended face upwards on a tray, the fur having been cut away from the thoracic area. The pericardial area is painted with

liquor iodi fort. A bowl containing half a dozen sterile 20 c.c. serum syringes is to hand. The syringes are quite dry, each one enclosed up to the top of the barrel in a large glass test-tube.

Each syringe has its needle ready fitted to it. The needles used for this operation are ¾ in. long, of steel, with rather a square point which must be extremely sharp. The syringes[1] are of the glass and metal type with an india-rubber piston which can be expanded at will by a screw in the handle. After choosing a syringe from the bowl, Dr. Nicolle was careful to screw up the metal cap which closes in the top of the barrel as tightly as possible. The suction of the piston was then very carefully adjusted so that the piston should move quite easily in the barrel and yet give good suction.

The third left costal space of the rabbit having been found, the needle is introduced as close to the sternum as possible, the needle and syringe



being held at right angles to the rabbit's body. The needle is pushed to its full extent straight into the rabbit's thorax with one sharp stab, gentle and steady suction is then made, and at the same time the needle is very gently withdrawn. Directly blood rushes up into the barrel of the syringe, the needle is kept still but the piston is very slowly withdrawn as the syringe fills. I saw Dr. Nicolle remove 20 c.c. of blood in this way after a single puncture. The needle, having been withdrawn, is removed from the syringe, the unplugged tubes containing the melted agar are handed to the operator by an assistant in quick succession, who adds to each one cubic centimetre of the blood and hands them back to the assistant who flames them, plugs them, rolls them quickly between his hands to mix the ingredients thoroughly, and at once puts them down in a sloping position. Great quickness and dexterity on the assistant's

[1] The ordinary 20 c.c. glass and metal serum syringe as supplied to military hospitals.

part are necessary to prepare the twenty tubes from one rabbit, as the addition of the cool blood to the agar may cause it to solidify before he can roll and slope them. The tubes are left in the sloping position all night, they are then placed in the incubator in the upright position for twenty-four hours to test their sterility and to allow the water of condensation to collect. The tubes are then ready for use and will remain good, if kept in a cool place, for a month.

I have described this operation of "aseptic puncture of the rabbit's heart" in some detail, because its success seemed to me to depend very much on small points. Dr. Nicolle lays stress on the necessity of obtaining a large rabbit; the operation is most difficult on even a moderate sized animal. It is also very necessary to have the syringe in perfect working order, and to have several ready to hand, because, if the first puncture does not succeed, it is best to try the second puncture with a fresh syringe, as the first will almost certainly be blocked with clotted blood. Again, the temperature of the melted agar, to which the blood is added, is of importance; if too hot the tubes are unsatisfactory, and if too cold they will set before they can be mixed and sloped.

It is not necessary for me to testify to the excellence of this medium for the culture of "Leishmania" and allied flagellates. The laboratory stock culture of Bouton d'Orient at the Institute has now reached its eightieth passage and shows no sign of deterioration. Though myself quite a novice at the work, I never had any difficulty in obtaining cultures of "Leishmania" from the cadaver, or subcultures, when using this medium.

Canine Leishmaniasis.—Soon after my arrival at the Institute, Dr. Nicolle suggested that I should carry out a further examination of the dogs in Tunis just as he had done in 1908, and the Yakimoffs in 1911. Nicolle examined his dogs during the months, March, April and May. The Yakimoffs examined theirs between January and May. Both these investigators found a very similar percentage of infected dogs, the former 1·8 per cent, the latter 1·6 per cent at Algiers. The brothers Sergent, during the months of July, August and September, had found as many as 7·2 per cent of the dogs to be infected. This great difference in the percentage of infected dogs in two towns, not so far apart, where the conditions of life seemed identical, might be explained by the fact that in Algiers the dogs were examined in the summer months, in Tunis much earlier in the year. I was to examine the dogs in Tunis during October and November; if my figures agreed with what had already been found in Tunis, then some other factor than the season must be responsible for the large number of infected dogs in Algiers.

From figures already published which I have put in tabular form, it is evident that there is a very great difference in the number of infected dogs found at various places on the shores of the Mediterranean.

Place	Dogs examined	Number infected with *Leishmania*	Percentage
Tunis, 1908	222	4	1·8
Tunis Suburbs	5	0	—
Gafsa	21	0	—
Sfax	5	0	—
Tunis, 1911	299	5	1·6
Algiers	125	9	7·2
Bordanaro (Messina)	33	27	81·8
Rome	60	16	26·6
(Lisbon)	300	8	2·6
Malta	83	7	8·4
Athens	184	15	8·1
Piraeus	40	3	7·5
Catania	275	3	1·09
Palermo	227	0	—

I examined dogs in Tunis between October 16 and December 5, as follows:—

Date	Number of dogs	Date	Number of dogs
October 16	13	November 13	9
,, 17	3	,, 15	2
,, 21	2	,, 19	3
,, 23	19	,, 20	7
,, 30	15	,, 21	10
November 2	1	,, 25	3
,, 4	2	,, 27	5
,, 6	20	,, 28	2
,, 8	1	December 2	1
,, 9	2	,, 5	7
	78		49
			78
		Total	127

Out of these 127 dogs, I found two infected with Leishmania, that is to say, 1·6 per cent, an exactly similar result to that obtained by the Yakimoffs in 1911.

The first infected dog found was the forty-eighth examined, the examination was made on October 30, 1912. The second infected dog was the ninety-ninth examined, the examination was made on November 20, 1912.

Dog No. 48. *October* 30, 1912.—Brought in eighteen hours after death. A full grown black and white dog. Neither emaciated nor obviously anæmic. Its coat was in good condition, there was no loss of hair. *Lungs* and *heart* normal. The *spleen* was considerably enlarged, being about twice as large as the normal for the size of dog. It was pale and rather granular looking, its consistence was normal. *Liver* normal. *Bone-marrow* of a bright red colour all through the bone. *Kidneys* were

pale, but not otherwise abnormal. Numerous Leishmania parasites were found in the bone-marrow of this dog; in the spleen smears parasites were rare; in a smear from the liver, one parasite was found after a prolonged search.

Tubes of N.N.N. medium were inoculated from the bone-marrow of this dog and a good growth of typical flagellated parasites resulted. In addition, two dogs were inoculated intraperitoneally with 4 c.c. and 3 c.c. respectively of a thick emulsion of spleen pulp in physiological saline solution. These two dogs were in good health when I left the Institute on December 13.

Dog No. 99, *November* 20, 1912.—Brought in twenty hours after death. A small emaciated black puppy; several patches quite bare of hair were present on the body, one of which was as big as the palm of the hand Eyes were normal. The animal was very anæmic. *Heart* and *lungs* normal. *Spleen* was not obviously enlarged, it was pale and soft. *Liver* was pale, not enlarged. *Bone-marrow* uniformly red and very liquid. *Kidneys* were pale. Smears from the various organs showed that this dog had suffered from a very intense infection. In the bone-marrow the parasites were the most numerous. In the spleen and liver smears, parasites were seen in large numbers. In a film of blood taken from the portal vein parasites were numerous.

Two monkeys and two dogs were inoculated with spleen pulp from this dog, and so far as I know these animals are still in good health. Tubes of culture medium were also inoculated, but these were contaminated.

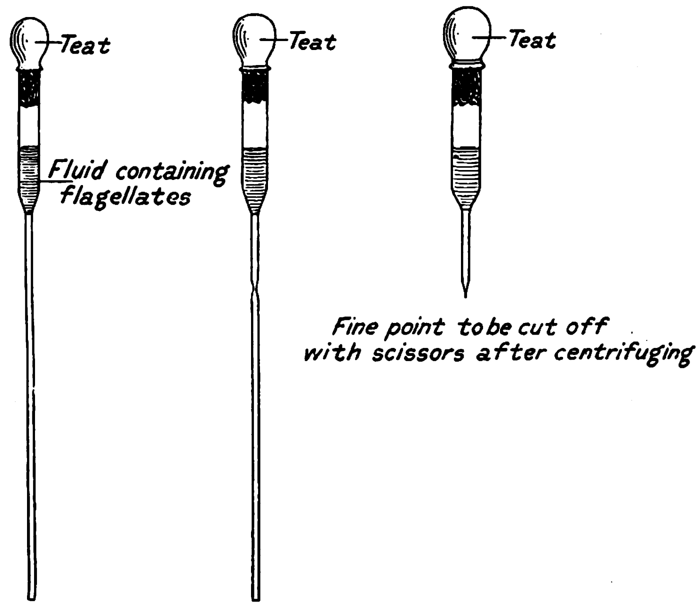
As was pointed out by Basile, and again by the two Yakimoffs, it seems that canine Leishmaniasis may exist in two forms: an acute form, from which dog 99 suffered, which attacks puppies and kills them in three to five months; in this form parasites are very numerous in the internal organs and even in the blood-stream, but splenic enlargement is not pronounced. A chronic form, dog 48, in which the animal does not appear to be ill, and the disease is only discovered by post-mortem examination. In this form parasites do not appear to be numerous, but there is considerable enlargement of the spleen.

The cultural forms of *Leishmania canis* have been so often and so accurately described by Nicolle, Basile, the Yakimoffs and other observers that a further description would serve no useful purpose.

Dr. Nicolle gave me cultures of two strains of infantile kala-azar (59th and 15th passages), of a strain of Bouton d'Orient (78th passage), and of a strain of *Leishmania canis* (20th passage), all grown on his own N.N.N. medium. I examined these cultures fresh, by ordinary and dark ground illumination; I made very numerous preparations which I stained by various methods, and, like other observers, was unable to make out any structural differences between them.

At first I found considerable difficulty in making good stained preparations of the cultural forms, the trouble being to avoid background staining. I found that the following method, which is a modification of that recommended by Dr. Nicolle, gave me the best results.

An ordinary pipette is taken and sterilized in the flame. When cool a little of the fluid at the bottom of the culture tube containing the flagellates is sucked up into the pipette, and then about three times the bulk of physiological salt solution. The culture and solution are drawn up into the wide part of the pipette and mixed. The tube is then sealed off high up, close to the wide part, the sealed end being drawn into a fine point as shown. The teat is removed and the tube containing the diluted



culture is centrifuged slowly for two minutes. Great care must be taken to protect the fine drawn-out bottom of the tube from breakage during the centrifuging. Practically all the cultural forms are now in the fine drawn-out point of the tube. The very tip of the tube is cut off with scissors and the drop of fluid which emerges, and which contains the parasites, is placed at one end of a clean slide. A drop of quite fresh human serum, of equal bulk, is now placed beside it; the two drops are thoroughly and rapidly mixed and filmed out with a spreader. The film is fixed in absolute alcohol for the regulation fifteen minutes. I generally stained my films with Geimsa's stain, using a mixture of 1½ drops of the stain to every cubic centimetre of distilled water, and staining for twelve minutes only. The action of the fresh serum on the washed flagellates causes them to take up the stain very quickly, and I found the above time ample. The films are then washed and blotted in the ordinary way.

Echoes from the Past.

ON THE TOPOGRAPHY OF MEERUTT.

By Assistant-Surgeon MURRAY.

(*Continued from p.* 609.)

The following observations are intended to show the peculiarities in the treatment of the diseases, in this part of India. In hot damp stations, a similar mode of treatment would not be equally successful. I joined this Division in November 1833, and since then, have several times been detached with Europeans marching in this part of the country, and absent in the hills on sick certificate. In consequence of the sickness of the Surgeon of the Brigade, the sick have been generally under my charge since October, previous to that period I attended half the European, with the Native sick. The treatment recorded is what has generally been found most successful at this station. I have added the result of the cases that came under my charge when detached, when the result tends to confirm any mode of treatment not generally employed.

Apoplexy.—This disease differs in no respect in its symptoms, or pathology, from the apoplexy of Europe. The cause is generally exposure to the direct rays of the sun—the sanguineous is most common.

The treatment is copious depletion, with strong mercurial, or croton purgatives, followed by local depletion, and counter-irritation, applying nux vomica to the blistered surface, and inducing mercurial action.

There have been nine cases amongst the Europeans, five of which have proved fatal, and one successful case in a native.

Cholera.—This disease shows all the characteristic symptoms, with all the varieties found in other parts of India. The attacks of the Europeans are analogous to those I saw in Paris in 1832, when it carried off upwards of a thousand a day.

I have not observed any change of structure in the vital organs invariably present, and those most frequently found might have been influenced by the remedies. The blood is unnatural, but whether this arises from the addition or retention of noctious ingredients, or from a combination of both, or from loss of some essential part—or the cause of this change—I know not.

I have seen most modes of treatment that have been suggested tried unsuccessfully—and many experiments made that never were published. Before the supervention of the collapsed stage, v.s., with large doses of calomel and opium, followed up by castor oil, blister to the epigastrium, with hot frictions of the extremities, is most successful, but occasionally totally ineffective. The disease occasionally yields, after the collapsed stage has commenced, whilst these remedies, or stimulants, or hot vapour baths are employed, but the only remedy that I have invariably seen exert an influence on the disease has been a saline solution. In 1833 I first employed this remedy in collapsed blue cases, by transfusing, through the veins in the arm, from three to five pints of a solution, containing one drachm of salt, and one scruple of carbonate of soda, to the pint of warm water, heat 110° F. In all reaction was induced, when various opposite modes of treatment were employed; in all purging returned with collapse, and death followed. It was given by the mouth, but it induced vomiting, and produced no benefit. This disease again came under my notice in 1834, when with a detachment of His Majesty's 11th Dragoons. The symptoms, and the treatment and its effects were analogous to what I have mentioned. From considering the decided, though temporary action of the saline solution, when transfused through the veins, together with its inefficacy when swallowed, I resolved to try it, in the form of enema, administered hot, and at short intervals. The following extract is from a report to Dr. Burk, Inspector General of Hospitals, in November 1834.

"In Marshall's case (of Cholera), the usual treatment, viz., calomel and opium, was pursued but without success; at 6 p.m. six hours after admission, the pulse was not perceptible at the wrist, the skin cold, blue and clammy, the countenance collapsed, and the voice gone; I thought the case hopeless, but as I had in several cases, on a former occasion, found decided, though temporary, benefit in this stage of the disease from the transfusion of a *saline fluid* into the veins, I ordered the following to be administered, as an enema, every half hour.

℞:	Muriatis Sodœ	℥ss.
	Carbonatis Sodœ	ℨj.
	Aqua Calidœ (120° F.)	lbj.

At 3 p.m. he was asleep; the pulse perceptible at the wrist. He had received two enemata. He got three more during night, at intervals, when he awoke. He had slept pretty well. The pulse was distinct, and the skin warm. The countenance more natural,

and the voice partially restored. The enemata were repeated every hour till noon, when the countenance and voice were natural, the pulse distinct, and skin warm; some brown matter brought away with the enemata; mercurial purgatives were then employed, and bilious stools procured, and he gradually regained strength, under the use of bitter laxatives. The effect of the saline fluid, administered in this manner, is not so rapid, as when passed directly into the circulation. In these, the change to the florid appearance of health, and return of the pulse, with the cessation of the spasm, was simultaneous with the transfusion. The temperature of the water I consider of importance. The order (in absence of a thermometer) was, "to be given as hot as could be borne, by the hand, without inconvenience."

Since that period I have tried this remedy in several cases, both European and native, varying the strength of the solution, and the frequency of its repetition, according to the violence of the symptoms, and the effect of the remedy. I have only lost one patient since, from this disease, a native, in whom the pulse had disappeared from the wrist. After two enemata, the pulse returned, and the vomiting and cramps ceased. I could not get a satisfactory account after this period. I believe the enemata were omitted, and he sunk.

The following case shows the advanced stage of the disease, from which this remedy has produced a cure. The reaction under the use of the saline solution—the collapse returning on its being omitted, and reaction following its being resumed, clearly connect them, as cause and effect. It occurred on a march, from Cawnpore, with the 3rd Troop 1st Brigade Horse Artillery in 1835. April 16th, Lalloo, syce, aged 50, was seized with cholera at 10 a.m. I saw him at ½ p. 11, he complained of violent vomiting and purging of a congee fluid, with severe cramps of the extremities and abdomen. Pulse very quick and weak, countenance shrunk.

℞: Pulv. Opii. gr. ii.
Subm. Hydr. gr. x. m. ft. pulvis. stat:
sumend, et meridie repetend—

1 p.m.—Has had several watery stools; is collapsed, no pulse at wrist, or temples; eyes glazed and fixed; cannot speak, extremities cold.

℞: Mur: Sodœ	.. .. ..	℥j.
Carb: Sodœ	.. .. ..	ʒj.
Aq: Calidœ (120° F.)	.. ..	lbj. solve,

fiat enema omni semihora injiciendum.

3 p.m.—Slight pulse at temples, a little warmth about the neck, speaks in a whisper, no vomiting nor cramps.

Cont: Enemata omni hora.

6 p.m.—Pulse perceptible, very quick at the wrist; arms and head warm; perspiring; countenance more natural.

Cont. Enemata 2da quaque hora.

9 p.m.—Pulse full and quick; skin warm; feels very comfortable; voice more natural.

Cont. Enemata.

17th, 6 a.m.—The enemata were omitted, during the night, on the march. The extremities are now cold. Pulse very weak and quick, no return of vomiting, or cramps; voice broken.

Rept. Enemata omni hora.

9 a.m.—Pulse quick and full; voice more natural; skin warm on the trunk and head.

Subm. Hydr. gr. v. st. sumend.
Ol: Ricini. ℥j. meridie.

6 p.m.—Several dark fæculent stools; has slight headache. Pulse quick and hard; skin hot.

Rept. Subm. Hydr.

He was slightly feverish for several days; bitter laxatives completed the cure.

Dysentery.—The symptoms of this disease are similar to those usually described, by writers on Tropical diseases, and to those which I described, in the Transactions of the Medical and Physical Society, vol. vi. p. 101. I am gratified in finding the opinion, I have advanced of this disease, being occasionally of an eruptive nature, supported by that of Mr. Twining, in the 2nd edition of his work on the diseases of Bengal, published nearly a year after that paper was discussed in the Society, of which he was Secretary; the probable connexion between ulceration of the colon and hepatic abscess, 2d edition, vol. i, p. 232, Note, will also be found in that paper, though he has forgot to mention these two circumstances. But, "de mortuis nil nisi bonum."

The disease is most common, during the hot and rainy seasons. The general causes are, sleeping in a current of air, or behind a tattee—eating unripe fruit, or drinking cold water, when much heated, and exhausted—I have seen no cases here, that I could trace to contagion, though many of the cases, that occurred in the detachment of recruits proceeding from Calcutta to Cawnpore in 1833, evidently arose from that cause.

In the treatment of this disease, the chief reliance is placed on

v.s. The patient is bled, from a large orifice, in the erect posture, to syncope, and this is repeated twelve hours afterwards, should there be no improvement in the nature of the evacuations, and again under similar circumstances, after another interval of twelve hours. I have never required to order a fourth bleeding. Twelve hours after decided improvement has taken place, leeches are applied over the part of the colon most affected, and repeated at similar intervals, as long as any active inflammation is present—as indicated by the nature of the stools—tormina or tenesmus. The internal treatment consists of an ounce of castor oil, containing from five to twenty-five drops of laudanum, given on admission, with two of the following pills, every two or three hours, according to the urgency of the symptoms:

℞ Pulv. Ipecacuanhœ
Ext. colocynthidis Comp.
Ext. gentianœ āā ℈ i. m.

Ft. massa, in pil. xii dividenda.

The interval is increased, and the dose diminished, as the disease yields, and the stomach becomes irritable. In cases complicated with affections of the liver, one grain of calomel or blue pill is added to each pill, after the more acute symptoms subside. Bitter laxatives complete the cure. It is essentially necessary to the success of this mode of treatment—that no solid food, and only a very little liquid be taken, when active inflammation is present. During the first, and second days, merely a little tea is allowed—afterwards an ounce of sago, made with water, is given three times a day—the diet is gradually increased, as convalescence advances.

The above mode of treatment is generally sufficient for all cases that have not been three days ill before admission. After this period, the effects of the inflammation have to be treated, after the inflammation is subdued by the above-mentioned means, these are thickening, or more generally ulceration of the coats of the colon. In many cases, persisting in these means, for a longer period is sufficient, but when the ulcers become indolent, as indicated by frequent whitish mucous stools, with little tormina or tenesmus, and dull pain on pressure, with fulness over part of the colon—a blister is applied, and half a grain of sulphate of copper substituted for the ipecacuan—and the following powder given, every second night:

℞ Tart: Antimon: .. .. gr. j.
Subm: Hydr: .. .. gr. v. m.

when the tenesmus is distressing, an enema of

Lot: Acetat: Plumbi .. .. .. ℥ii.
Tinct: Opii .. .. ℥ii.

given at bed time, gives relief. In one or two protracted cases, the following powder, every three hours, has been useful:

℞ Pulv: Opii. .. .. gr. ½
Acetat: Plumbi .. .. gr. ii.

I have not seen any advantage, from giving free purgatives every morning, as recommended by many authors. The castor oil with laudanum, after the bleeding, freely evacuates the bowels, no food is allowed that could leave any existing fœculent matter, and the small quantity of colocynth in each pill removes the secretions. When the cœcum and iliocolic valve are affected, vomiting is very troublesome, in such cases, advantage is derived from the application of a blister, before the active depletion has ceased. When hepatic obstruction exists—mercurial action is excited; I have only employed this last remedy in two cases.

Diarrhœa, when not colliquative or dependent on chronic enlargement of the liver or spleen, yields readily to analogous—though milder treatment.

There have been, amongst the Europeans, 31 cases of diarrhœa, and 102 of dysentery, of which three have proved fatal. I have had about fifty other cases unconnected with this Brigade, only one of which died—this termination was produced by cholera, the day after admission. Amongst the natives there have been sixteen cases of diarrhœa, and twelve cases of dysentery, one of each of which proved fatal.

Delirium Tremens is a common disease, and though not attributable to any peculiarity in this branch, is still partly dependent on Military service. It appears after an excessive debauch, or suddenly ceasing the habitual use of too much spirits—most Military offences are committed, when *under the influence of liquor*—the most frequent punishment is confinement to the guard or conjee house, where the food is bread and water, and where spirits are strictly prohibited; such are the circumstances under which this disease is to be anticipated, and such is the history of most of the cases. It is usually guarded off, in the barracks, by gradually discontinuing the stimulants, and such is indicated, as the prophylactic treatment —but as giving the usual stimulant would diminish the punishment, it ought to be combined with some bitter, as gentian or cheretta, and as constipation is a frequent concomitant, the addition of senna would be advantageous. I never saw a native labouring under delirium tremens.

In the treatment of this disease, I have found depletion, and counter-irritation assist the action of the opiates, in a very marked

degree—bleeding to fainting in the young and plethoric, or leeches to the nape of the neck in old broken-down subjects, with strong mercurial purgatives are employed on admission, with two drachms of laudanum or four grains of opium, every three hours during the night. Next day, should sleep not have been induced, a scruple of calomel and one grain of tartar emetic is given in the morning, and two drachms of compound powder of jalap at noon, or an antimonial purgative, in small doses, during the day, repeating the opiate at night. Should this not have induced sleep, the calomel is repeated next morning, with the jalap at noon, and a blister is applied to the nape of the neck, and the opiate repeated at night. There are few cases, in which sleep is not induced before next morning; then a few stimulant purgatives complete the cure. Should the third night pass restless and furious without sleep, four grains of calomel and one of opium are given, every three hours, during the day, and at night a caustic blister to the neck, with the strong opiates repeated. I have seen the patient sink into a sound sleep ten minutes after the application of this blister, before any additional opiate had been given. This mode of treatment is continued till sleep be induced, which takes place generally on the first, and very rarely later than the second day. The mouth is always found affected by the mercury, when the patients waken. Stimulant laxatives finish the cure—the mouth sometimes becomes very sore.

The worst cases appear in broken-down confirmed old drunkards, who have not been many weeks discharged, till they return with aggravated symptoms. In these cases the stomach is very irritable, the pulse quick, weak and irregular, and the secretions very much deranged. In these cases a blister is applied to the epigastrium, the bowels freely opened by purgative enemata, and occasionally the opiates are given in enemata. The insensibility of the system to the action of opiates is remarkable. One patient retained an ounce and half a drachm of laudanum (given in four enemata of three drachm doses, at intervals of three hours) for some time without producing any sensible effect—he afterwards recovered.

The irritability of the stomach in many cases depends on the state of the brain; in some, from the tenderness or pain on pressure over the epigastrium, it is evidently connected with gastritis. In these, depletion, with purgative enemata, and effervescing draughts containing laudanum, and a blister to the epigastrium remove the irritability, and generally induce sleep. Cases, complicated with hypertrophy of the heart, are most violent, and complications with disease of the lungs most dangerous.

There have been sixty-eight cases admitted, of which four have proved fatal. Three of these confirmed old drunkards, one of whom had extensive cavernous ulceration in the lungs; another had the cortical part of both kidneys nearly all destroyed, combined with great enlargement of the liver; the other had the liver very much enlarged, with the cicatrices of several old abscesses. The fourth patient drowned himself, the day after admission. The case is subjoined, as very important, in showing the morbid appearances, in the first stage of this disease.

Pat. O'Connor, aged 29, Gunner, 1 Company 3d Battalion—convalescent from intermittent fever; on his way from Mhow to Landour, has several times suffered from delirium tremens, during which he is reported to have been exceedingly violent; has been drinking hard for several days. He attempted to cut his throat at 3 p.m. and was brought to Hospital at 5 p.m. on the 2d March 1836—he is restless, has not slept for four nights—no pain, bowels costive, p. 76, T. clean, S. cool.

℞ Pulv: Ipecac. .. .. ℈i.
Tart: Antimon: .. .. gr. ii.

Ft. pulvis st: sumendus.

℞ Subm: Hydr:.. .. .. gr. x.
Ext: Colocynth: Comp: .. .. .. ℈i.

Ft. massa in pil. iv. divid: hora somni sumendas.

Pulv: Jalap: Comp: .. .. .. ʒii. cras mane.

3d, Bowels freely opened, was restless, did not sleep, is quiet, and says he is quite well; p. 76, T. clean, S. cool.

℞ Tinct: Sennæ .. .. ℥i.
Infus: Cherettæ .. .. ℥ii. m.

Ft. haustus statim sumendus, et meridie repetendus—spoon diet.

Vespere. Continued well, and cheerful during the day; at half-past five, slipt from his guard, jumped into the Hospital well, sunk immediately, and was dragged up, half an hour afterwards—dead.

Sectio Cadaveris, 14 hours after death. Body not emaciated—frothy fluid issuing from the mouth, and nostrils—the pendant parts of the body livid, the upper pale; limbs rigid; blood dark, liquid.

Head.—Venous congestion on the surface, and more bloody points, than natural, in the substance of the brain, which was of the usual firmness. Two ounces and a half of serous fluid, under the arachnoid, and in the lateral ventricles.

Thorax.—Lungs emphysematous; did not collapse when the thorax was opened, frothy fluid in the bronchia, and through the lungs, which were heavier than natural—heart empty, with considerable hypertrophy of the left ventricle.

Abdomen.—Liver and spleen considerably enlarged, structure natural—there was a florid flush over the intestines; and they felt doughy; stomach much distended with food and water—mucous coat very vascular, and much thickened. Gall bladder small, covered by a false membrane, and adhering to the colon, it contained a small quantity of light yellow bile.

Remarks.—The previous attacks had commenced in a similar manner. From the mildness of the symptoms, I tried to ward off the attack—opiates would have been given at night.

Fevers.—Continued fever is very rare—the few cases, that occur, appear in the hot season, and arise from exposure to the sun. The symptoms are headache, pain in the loins, and limbs, with hot dry skin, and quick hard pulse.

The treatment is purely antiphlogistic, viz., v.s., leeches, antimonials, and purgatives.

There is no distinct line of demarcation between the intermittent and remittent fevers, the former occasionally assuming the latter type, and vice versa; and either, in their progress becoming continued. The most common form, during the hot and cold seasons, is an inflammatory quotidian, commencing with rigors, and followed by sweating. The rigors, as the disease advances, become less distinct, the sweating more partial, and the remission less perfect, whilst the hot stage becomes longer, and at last constant. It commences occasionally as a tertian, and passes through a similar course, becoming constant after the third or fourth paroxysm, delirium or symptoms of some organic lesion are then developed, if not previously evident. Headache, pain in the loins, and thirst are the symptoms most commonly complained of. The bowels are costive, with occasional nausea. Tongue furred, pulse quick, and hard. Skin dry, conveying a harsh, tingling, sensation to the touch. This dryness occasionally remains, after the other symptoms have disappeared, but while this is present, convalescence is not established.

The treatment is generally purely antiphlogistic. On admission the patient is bled to fainting, and gets a purgative of calomel and jalap, with the following draught every three hours.

℞ Tart: Antimon: .. .. .. gr. j.
Infus: Sennæ: .. .. .. ℥ ij. m.

At night, if much local pain or hardness of pulse remain, v. s. is repeated, and the following powder given :—

℞ Tart: Antimon: .. .. gr. j.
Subm: Hydr: .. .. .. gr. x. m.

but should there be much improvement, leeches are applied instead of the v. s. and the antimonial mixture continued.

On the following morning, according to the progress of the symptoms, v. s. or leeches are employed, and the antimonial mixture continued during the day, and leeches and the calomel powder at night, should the symptoms not be very much diminished; but in the great majority of cases, continuing the antimonial mixture is sufficient to remove all the symptoms. It is afterwards given at longer intervals, and the cure is completed by bitter laxatives.

The diet is confined to sago, as long as dryness of the skin remains, then milk and bread allowed, and the diet gradually increased.

Occasionally the headache continues with quick pulse, dry skin, and restlessness or delirium after the third night, then the local depletion is continued, with five grains of calomel every three hours, using a purgative, if the bowels be not freely opened, and at night repeating the leeches or applying a blister, and giving the accompanying powder:—

℞ Tart. Antimon...	.. ..	gr. ii.
Subm. Hydr. ..	.. ..	℈j. m.

omitting the antimony, should the stomach be very irritable, the calomel is continued next day, till mercurial action be induced, when the symptoms generally yield, and laxatives finish the cure. Sulphate of quinine is found beneficial in accelerating convalescence; though it is generally pernicious, if given early, when dryness of the skin remains. When the fever assumes a distinct tertian type, the sulphate of quinine is an invaluable remedy, and rarely fails in producing a cure, after the bowels are freely opened, and the secretions become natural. It is found most efficacious, when given uncombined with other medicine, in divided doses, the intervals so calculated, that one dose shall be given half an hour before the usual period of attack.

In a few instances, generally towards the end of the rains, the disease assumes a typhoid remittent type, the chief characteristics of which are rapid prostration of strength, quick, weak pulse; partial, clammy sweats, and low muttering delirium. This rarely appears in the cold or hot seasons, when the above-mentioned treatment is *early* had recourse to. When the disease assumes this form, calomel and tartarate of antimony are given during the exacerbation, and sulphate of quinine, when a distinct remission is procured—counter-irritation is employed, and the bowels kept freely open. In cases, where immediate danger was anticipated,

calomel combined with quinine was given, during the partial remission, if the head were cool—even though there were headache, and delirium, during the exacerbation. It appears, in these cases, to render the system susceptible of mercurial influence, and when ptyalism is excited, recovery ensues. I have given the quinine successfully under these circumstances, when from the dull headache, dilated pupil, and giddiness on assuming the erect posture, I inferred that effusion had taken place on the brain. It is a powerful, active remedy, even when scruple doses of calomel appear inert—and its effects must be closely watched. I persist in its use, even though it increase the headache—if the pulse become slower, and the head remain cool. When the pulse becomes strong, and the head hot, the quinine is omitted, and the calomel continued with purgatives, according to the state of the bowels; it is resumed, on the remission re-appearing—and ptyalism may then be anticipated. When there was great prostration of strength, with coldness of the extremities, a favourable result has been assisted by a combination of quinine, port wine and cheretta—quinine is of great use in the convalescence of these cases—and a change of air is generally necessary to re-establish health. In cases of this description, the closest attention is necessary to the development of old, or the supervention of new symptoms—these may require local depletion—whilst general stimulant treatment is pursued—the local complications will generally indicate the treatment, during convalescence.

The use of very large quantities of mercury occasionally produces no constitutional effect, till some days, or even weeks, after it has been discontinued, and convalescence has been established, then the gums become swollen, and shrink from the darkened teeth. Excessive salivation, with ulceration of the gums, tongue and cheeks, occasionally supervenes towards the end of the rainy season. This accident is generally connected with enlargement of the spleen; but I have seen severe salivation, when it was not apparently enlarged, from a few grains of calomel—in one case, nineteen grains, and in another sixteen grains of blue pill. Sulphur in repeated full doses was given in these cases, and in none did sloughing of the cheek nor necrosis of the jaw ensue; though I had two patients during the season, under my charge, to whom these accidents happened.

There have been two hundred and thirty-four European cases of fever, of which seven have proved fatal; and two hundred and forty-nine native admissions, of which fifteen have died.

Since the commencement of the last cold season, the natives have suffered from a very dangerous remittent fever, with yellowness of the skin, and conjunctiva; they seldom complained of local pains. The most prominent symptoms, at the commencement, were suffused eyes, slight headache, and great prostration of strength, with early delirium during the hot stage; the remissions at first well marked, became indistinct after the second day, and yellowness of the conjunctiva, great prostration of strength, sordes on the teeth, quick feeble pulse, low muttering delirium, and coldness of the extremities followed.

The emaciated, ghastly appearance of the patients on admission, after the third or fourth day of the attack, made me doubt their history of the disease, till it received confirmation from several cases that occurred, amongst the attendants and patients in the hospital. It was evidently contagious; one man attending on his friend caught the disease, and lay four days comatose—his brother caught it while attending on him and died—so that, it evidently was not rendered milder by transmission. The treatment was leeches to the nape of the neck, a mercurial purgative followed by an antimonial solution—sulphate of quinine was given, when a distinct remission was obtained; they were generally admitted after the second day, and had delirium on the first accession of the hot stage—and after the second accession they remained dull, rather comatose, with yellowness of the conjunctiva, and sordes on the teeth. They then sunk into a state of low muttering delirium, with coldness of the extremities; blisters were applied to the nape of the neck, and quinine given alone, when the remission was perfect, and combined with calomel when imperfect. In several cases where the collapse was great, powdered capsicum and quinine were given, till reaction took place. The treatment was then regulated by the symptoms that appeared. The bowels were kept open by enemata or mild laxatives. Free evacuation was avoided, as it induced very great prostration of strength. I attributed the death of one patient, who was beginning to rally from this advanced stage, to the moderate action of an ounce of castor oil. Hickup was a troublesome symptom in some of the cases that used the capsicum; it was relieved by effervescing draughts, and assafœtida with a blister to the epigastrium. The gums were affected, but free ptyalism was not induced in any case. An inordinate flow of urine was the first favourable symptom, in many of the cases. The convalescence was tedious. A change of air merely to the lines was found very beneficial, in the con-

valescence of some cases—the following case shows clearly the early morbid appearances. In all that died there was serous effusion in the brain.

Lalloo, syce, 1st Troop, has been ill with fever for five days, is now delirious, with great tenderness in both hypochondria, conjunctiva yellow, pulse quick, skin hot.

App: Hirud: ..	..	..	xviii. epigastrio.
℞ Tart: Antimon:	..	..	gr. i.
Subm: Hydr:..	..	..	gr. iii. m. ft. pulv.:

tertia quaque hora. repetendus.

He died on the accession of the hot stage, thirteen hours after admission.

Sect: *cadaveris.*—There was a copious, red, serous effusion under the arachnoid, and at the base of the brain. The pia mater vascular, with numerous bloody points in the substance of the brain. The thoracic viscera were healthy, the blood dark and liquid; the liver was enlarged, dark, and friable; the spleen much enlarged. There were no other marked morbid appearances.

This disease has become much milder, and more tractable, since the hot season commenced.

Hepatitis is a very common and dangerous disease; independent of the usual influence of the climate, the disease is connected with the very hot state of the barracks, and in some instances, with injuries received on duty. It appears most frequently after the rains; but it is found at all seasons. During the practice season in the cold weather, it has the strongest tendency to terminate in abscess; pain in the right hypochondrum, increased by pressure or full inspiration, and uneasiness in the right shoulder are the usual characteristic symptoms. The pulse is quick and hard, but the skin is rarely hot and dry. The sounds elicited by percussion are of the greatest importance in ascertaining the size of the liver, and in assisting in the diagnosis between inflammation of the surface, and that of its structure, and in the progress of some hepatic abscesses.

In the treatment, the chief reliance is placed in v.s. carried to syncope on admission, and repeated at intervals of twelve hours, till the acute symptoms yield. It is rare to repeat it more than three times, but in one case it was repeated four times to syncope, or till the blood ceased to flow. This, in dangerous cases, I consider the only true criterion of the quantity, as indicated by the constitution, requisite to subdue the inflammation, and v.s. to syncope is invariably my order, when a vital organ is acutely inflamed. The effect of a bleeding to 50 or 60 ounces is most satisfactory, in

subduing alarmingly dangerous symptoms, and I never saw any unfavourable consequences result. The largest quantity that I ever abstracted at one bleeding, was on admission from a plethoric young man, with acute hepatic symptoms, where the liver extended three inches, beyond the ribs, in the epigastrium. Seventy-two ounces were abstracted before fainting was induced—next day the liver was reduced two inches, and he was convalescent in ten, and he might have been discharged, in a few days, had he not got an acute attack of rheumatism in the wrists and ankles, from lying in the current of a tattee; these symptoms yielded readily, he was discharged on the 28th day. I bled an old Major in 1835, who had acute symptoms of determination of blood to the head, to 64 ounces before syncope was induced, since then he has enjoyed better health than for years previously. In general the total quantity of blood abstracted is less, the acute symptoms yield more readily, and the convalescence is more rapid in dangerous cases, when the first bleeding exceeds forty ounces, than when it is under that quantity. In those cases where fainting was induced, before six or eight ounces are abstracted, no benefit was derived from the operation, and instead of being repeated a large number of leeches were applied with advantage.

Whilst acute inflammation is present, nausea is kept up, during the day, by frequent doses of antimonial purgatives, and at night a scruple of calomel and one grain of tartrate of antimony are exhibited with a purgative in the morning, should the bowels not be freely opened. When the active inflammation is subdued, leeches are applied to the side, and two of the following pills given three times a day, till ptyalism be excited, tenderness of the gums is not enough.

℞ Subm: Hydr:
Pil: Hydr:
Ext: Colocynth: Comp: āā ℈ i m.
Ft. mass: in pil. xii divid: sumat. ii. ter. in dies.

Ptyalism has generally commenced by the fourth or fifth day, after which, there is seldom much uneasiness in the side. The gums are kept tender, for a period proportioned to the previous obstinacy of the symptom; the bowels are then kept open by simple laxatives, with an occasional dose of blue pill.

During the active treatment, merely a little tea in small quantities is allowed, and until the gums are getting well, only an ounce of sago three times a day. After this milk and bread are allowed, and the diet slowly increased.

Blisters are seldom applied with advantage, except there be obstinate pain depending on inflammation, extending to the surface.

In the diagnosis of hepatic abscess, much confidence cannot be placed in any single symptom, nor often in any combination of symptoms, during the examination of one day, or even occasionally of several days. All appreciable symptoms are sometimes for days totally wanting, and frequently merely such slight symptoms are present as are generally found in cases that do not terminate in abscess. Abscess is more frequently formed, and re-absorbed, or evacuated, than is generally supposed. In some cases, the pus remains encysted for several years. This opinion is formed, from an examination of the previous history, compared with the post-mortem appearance of patients frequently in hospital, with symptoms analogous to those which proved fatal, and from the appearance of cicatrices on the liver. This advantage of tracing the symptoms connected with morbid appearances of old standing, can seldom be found except in regimental practice. Protracted convalescence with quick pulse, and the occurrence of uneasiness or pain on slight irregularities of diet, or the exhibition of improper medicine, form the foundation of my diagnosis. As the abscess increases, many auxiliary symptoms appear, depending on its situation. Whilst still in the the centre of the liver, diarrhœa, and increased size are generally found, with difficulty of exciting ptyalism. If to these be added the supervention of dry cough, with increase of pain on turning on the left side—or pain in the stomach, with vomiting—or acute or dragging pain on flatus or fæces passing the arch of the colon—the diagnosis of hepatic abscess is pretty clear.

It is frequently fatal without bursting, and always so when bursting into the peritoneum—one case that was in hospital, last cold season, may be an exception. This case, J. Grogan, Gunner 2d Company 2d Battalion, had long protracted convalescence from fever, with enlargement of the liver, followed by fixed acute pain in the epigastrum, and vomiting, these were his symptoms, on his re-admission, under my charge, on November 28, 1836—that night, when vomiting, he felt something give way—this was followed by burning pain in the epigastrum, spreading over the abdomen, tormenting thirst, great oppression of breathing, pulse 144, vomiting constant, he got frequent doses of opium combined on the 30th with calomel, and he rallied; but as his bowels were costive, he got a purgative, on December 1, which produced several very dark,

watery stools, but caused a return of the pain in the abdomen, and the vomiting—on the 2d the oppression of breathing was very great, countenance sunk, skin cold, clammy, pulse 142—he got a glass of port wine, every two hours, till he rallied—and the bowels were kept open, by enemata till the 8th—he was discharged well, on January 4, 1837.

The constant motion, and irritation from coughing, generally causes a fatal termination, when the abscess bursts through the lungs. In one case, that proved fatal in February last, the abscess in the liver had healed, but a large one had formed, between the communication with the bronchia and the diaphragm, which caused death.

Bursting into the colon is most favourable; in one case the puriform discharge ceased, twenty days after the abscess burst, and he convalesced rapidly—I have suspected evacuation in this manner, in several cases, but the diagnosis was not without doubt.

An early operation, for the evacuation of the abscess, would be beneficial in many cases, as it is not very painful, and if carefully performed, not likely to increase the danger of the case.

The decision of the question, whether an abscess can, or cannot be re-absorbed, is very important in a practical point of view, as one of two opposite modes of treatment must then be selected, either to give tonics to make the abscess point, and to support the strength, so that when it bursts, the discharge may not exhaust the weakened constitution—or to continue efforts, for its re-absorption, which are of an antiphlogistic nature. I adopt the latter, till the abscess is pointing, then support nature, and alleviate distressing symptoms, till it burst, and afterwards give tonic medicines, and more generous diet, with a little blue pill occasionally, the constant motion during a march is very unfavourable to cases of hepatic abscess.

There have been two cases of hepatitis amongst the natives of the brigade, and I have now a third case under treatment; the first was caused by a blow, abscess followed, and he died. From the appearance of cicatrices radiating from the abscess, the liver must have been extensively lacerated by the injury. In the other two cases, the symptoms were very analogous to those in Europeans and they yielded—though very slowly—to local depletion, and mercurial action. They were of some days standing, and had used inert remedies previous to admission.

Small-pox has been very prevalent during the last cold season; it has appeared under all the circumstances that are supposed to

guard against its attacks, viz., in those who have had the disease naturally, and from inoculation, in those who had been vaccinated, and in those who had resisted vaccination, some weeks previously, and in one child under two months of age. Many had neither been vaccinated, nor inoculated. The eruptive-fever was slight in some, and not much modified in others, who had been vaccinated or inoculated—in these the eruption was generally scanty, though in two cases it was confluent on the face; several cases in one family, and many isolated cases occurred, there was nothing peculiar in the treatment.

There were thirteen cases amongst the Europeans, one of which proved fatal, and ten amongst the natives, all of which recovered.

Venereal.—There are a great number of cases of these diseases, which may in part be attributed to the want of a lock hospital; the prostitutes are carefully examined once a week, and tickets given to the healthy; but as the sick are treated as out-patients, they may, and frequently do disseminate their diseases.

Gonorrhœa is treated by antimonial laxatives, with leeches to the perineum, and spoon diet, till the active inflammation is subdued; then cubebs given, or sulphate of zinc injections used, with more generous diet. There have been sixty-seven European, and two native cases.

Ulcers are very common; they are generally inflamed on admission, and treated antiphlogistically with antimonial laxatives, and spoon diet. In a few cases v.s.; and in many, where there were buboes, leeches were employed, and when the sores became indolent, mercury was given to affect the system; this was seldom requisite. The local treatment depended on the appearance of the sores, at first poultices, then black wash, and occasionally calomel in powder.

There have been one hundred and thirteen European and twenty-three native cases, of secondary symptoms. In patients who had the primary disease, before arriving at Meerutt, I believe several of these sores were induced by the intentional application of irritants, they have become less frequent since several suspicious cases were treated with an antimonial-assafœtida mixture; these are the only cases that I have suspected of being simulated.

An excellent opportunity is afforded, in the Horse Artillery, of contrasting the local and constitutional effects of injuries, in the Europeans and natives. There are about four hundred of the former, and fifteen hundred of the latter, under medical charge, and similar accidents are frequently admitted at the same time,

in young robust men apparently under similar circumstances, in every respect. In natives the pain, swelling, and redness are less marked, and the constitutional disturbance very frequently imperceptible, always much less developed than in Europeans, in whom similar inflammation produces high symptomatic fever. Bruised injuries, such as bites, very readily proceed to sphacelation in natives, and the loss of substance is slowly repaired; the sores are very apt to become indolent. From the slight constitutional disturbance induced, natives recover from much greater disorganization, or extensive wounds than Europeans. This may in part be accounted for, independently of the sympathetic affection, either alone proving fatal or producing great prostration of strength, by the consequent inflammation not being so great, and therefore not producing such extensive additional local disorganization. On this account, on natives, surgical operations are performed with comparatively little danger, and some may be performed that are considered too dangerous to be attempted on Europeans.

The effect of remedies is analogous in both ; but most powerful in natives, particularly that of purgatives and emetics, when free action causes a proportionately great prostration of strength. Great attention must be paid to this, in the advanced stages of severe fevers. The energy of the treatment required for natives bears a similar proportion to that required for the French, which the treatment required for the French does to that required for the English. The following cases may serve to illustrate what has been here advanced.

A syce was admitted on June 8, 1834, with extravasation of urine, from stricture of the urethra causing hard, inelastic swelling of the scrotum and pubes, round the root of the penis; the parts were cool and not very painful, p. 80, T. clean and S. cool. A flexible catheter without the stilette was passed into the bladder and retained — twenty leeches were applied, and a purgative given.

5th. Parts more tender—no fever. Twelve leeches were applied, with fomentations.

10th. A small opening formed at the left side of the scrotum, through which a large quantity of pus and urine escaped. There was crepitus over the pubes, at the right side of the root of the penis. A free incision allowed the escape of a quantity of air and pus.

A catheter was retained in the bladder till the 24th, no urine escaped by the wound after the 16th. A catheter was occasionally

passed for some days, and he was discharged well in the beginning of July. In 1835 he was admitted with an ulcer on his leg, he had never suffered any inconvenience in passing his urine since his discharge.

Another syce in 1835 had the penis pulled out from the root of the bulb and ascending rami of the ischium, by a horse—and another in 1837, had the left side of the scrotum, and the left testicle torn away, also by a horse—and in neither was there any constitutional disturbance.

A. B., aged 35, Gunner H. A., admitted on June 10, 1834, complaining of a painful dark swelling, about the size of half a hen's egg, situated at the root of the penis. It appeared last night, after he felt something *give way* in coitu—he passes his urine freely, general health good—leeches were applied, with cold lotions and a purgative given. It remained rather painful till the 15th, when after some difficulty in passing his urine, it became extravasated round the tumor, which enlarged and became very painful with fever, p. 96 sharp, T. white, S. hot—twenty leeches were applied, and antimonials given; they were repeated next day, as no improvement had taken place on the 17th, the swelling was freely laid open, urine escaped from the wound for several weeks, and he remained long very weak; he was discharged well on September 13. During a march to Agra in October, difficulty in passing his urine returned, followed by the wound re-opening, and he again came under my charge in June, 1835, with the urethra at the anterior part of the wound completely closed, I was attempting to re-open the passage by caustic, when sickness obliged me to go to the hills. A syce was admitted on June 8, 1835, complaining of having received a kick from a horse on the right knee, the wound was an inch and a half long, communicating through a longitudinal fracture of the patella, with the inner joint. A quantity of blood and air was pressed out of the joint, there was not much pain, but he was bled as a precautionary measure, the edges of the wound were brought together by adhesive straps, and the muriate of ammonia lotion applied, the leg was put on an inclined plane; there was slight pain in the liver, for several days, for which leeches were applied, but no constitutional disturbance. The Patella apparently united, and he was discharged quite well, on August 10.

Natives generally have an aversion to entering Hospital. Those not obliged to attend regular regimental duty seldom apply for advice till their diseases are far advanced. Many natives unconnected with the Brigade apply for assistance, under similar

circumstances, when their Hakeems have failed to cure them; they do not like vaccination; here small-pox is a common disease. A few scrophulous and calculous cases occasionally appear; I have removed four calculi, three of them with success, and one fatal from hæmorrhage, when straining at stool, three weeks after the operation: this happened during the rains, he had suffered from remittent fever before, and it returned some days after the operation. Leprosy is a common disease amongst the poorer classes. The Mudar (*Asclepias gigantea*) appears to arrest its progress, and heal the sores, but the cure is merely temporary. It commences like the Paraplegia Adultorum of Earle, with loss of sensation, and motion of the extremities. In most cases irritating the ulnar nerve at the elbow, causes a painful tingling to the end of the fingers, as in cases where the Paraplegia depends on an affection of the medulla spinalis. Under this impression, I have applied blisters to the nape of the neck and apparently with advantage; but as the patients were not connected with the Brigade, I could not trace their future history.

Dracunculus is not an indigenous disease; but I have seen it in native merchants, who travel much; one worm moved, for several seconds, after it was extracted.

Cataract is very common; I have couched here, and in the hills, almost fifty eyes, most with success. I saw a number of cases of deafness, in the hills, caused by cerum accumulated in the meatus externus. Most were cured by its removal; one boy, about 12 years of age, had been deaf and dumb from birth. I removed a plug of dark, hard wax from each ear, and he heard with the right. The slight constitutional disturbance excited by extensive disease, on the surface of the body, in natives must be born in mind, when a similar extent of constitutional disturbance is excited by internal disease.

As I have had an opportunity of observing the effects of change of climate to the hills, on the officers and men of this Brigade, and as I twice went to the hills on sick certificate, where I attended many of the sick, I may be allowed to offer a few observations on that subject. During the cold season the climate is very cold and invigorating, and during the hot season cool, pleasant and healthy; during these two seasons it is equal, if not superior to any European climate for most of the diseases of this country. During the rainy season, it is damp, chilly and unhealthy. Most of the recent serious cases remain stationary or fall off during this season, while many old Remittent, Rheumatic, or Dyspeptic cases have

relapses. Though unhealthy, in comparison with the other seasons in the hills, or with a European climate, still it is much superior for all remittent, and dysenteric cases, to the hot damp climate of the plains, during that season.

The greatest advantage is derived in debility, arising from acute attacks, in men lately arrived in the country. A residence during the hot and rainy seasons, generally restores them to their original vigour, which is confirmed by the next cold season in the plains. But in extensive organic disease of long standing, and in dangerous attacks of old residents, the above period is insufficient to produce a permanent renovation, in the weakened constitution. In many of these cases the bracing cold season has been of the utmost advantage.

Including the whole season, the climate of Landour or Simlah is superior, in no case of disease, to that of various parts of Europe, and it is inferior, in several of the common diseases of this country. The high elevation, and the great power of the direct rays of the sun render it inferior, in some pulmonary, and cerebral diseases, and the periodical rains in rheumatism, ând extensive, long standing, organic disease, induced by remittent fever; dyspeptic patients, particularly old residents in India, suffer much from torpor of the abdominal viscera, during this period.

The periodical rains, the only unfavourable season, in the hills, for Indian diseases, may be avoided by crossing the snowy range to Kinour, where, by residing during the rainy season, at Soognum or Naiko (villages 23 and 25 marches from Simlah), a climate may be enjoyed drier, and cooler, than an English summer; so little rain or moisture falls that the soil is incapable of supporting vegetation. The country is formed of a succession of steep, brown, barren stony mountains, without a tree, and with scarcely a trace of vegetation, except along the channels of the torrents formed by melting snow, on comparatively level ledges; near these the inhabitants, by hard, and incessant toil, form level beds, which by irrigation afford a scanty subsistence. This *dry*, cool climate is more favourable to some of the Indian diseases, than any transmarine climate, with which I am acquainted. This opinion is founded on the decided benefit derived here, in many diseases, during the hot winds. It is, as has been already mentioned, *dry* as well as cool, and on this depends its beneficial effects, as heat combined with *moisture*, in this country, as in all other tropical climates is unhealthy.

At Naiko the beneficial effects of the dryness are not diminished

by the debility induced by great heat, neither are they counteracted by a hot damp season following, as in the plains. This opinion is supported, by the inhabitants not being subject to those diseases peculiar to such climates; and in part confirmed by the result of my own, and a few other cases, that have tried it. I would not recommend the invalid remaining there, during the winter, as the country is much under snow, and the necessaries of life are expensive, and procured with difficulty. He should leave Simlah, in the beginning of June, and return in the beginning of October.

Note on the Foregoing Report by Mr. Superintending Surgeon Playfair.

The remarks of Dr. Murray, are correct to a certain extent, as they concern the climate of the hills; in some points however I am scarcely prepared to concur with him.

He says, that during the rainy season, it is "damp and unhealthy," and also "chilly." The climate is damp, so is almost every place during this season, but chilly it is not, the temperature is too high, too mild, much too equable, to produce chilliness. It is not "unhealthy." It does not affect the sound, and only in a very few instances the diseased. As a proof of this, the sick list does not increase, on the contrary, the amendment continues progressive throughout that season. The equability of the temperature, although combined with moisture, is favorable to pulmonic, and even more favorable for rheumatic cases, than the variable and changeable climate of Britain. It is decidedly more favorable in strumous affections, than that of Europe, and more so, in such pulmonic affections, as incipient phthisis, and asthma. During the first year's residence in the mountains, those who have suffered from severe intermittent fever, with enlarged liver and spleen, have generally, at the commencement of the Rains, a few febrile paroxysms, which however yield without difficulty, and it is not found, in their second season, that the same cause produces the same effect. Patients similarly situated, on their landing in England, suffer in the same manner, on their first exposure to damp and moisture, and the climate of the Hills is greatly superior to that of Europe, inasmuch, as most obstinate diseases contracted in Arracan, and elsewhere, have not resisted the influence of two seasons; whereas the soldiers from the Walcheren expedition, even in the climate of Britain, hardly ever recovered, so far as to escape an attack of intermittent, if exposed to cold and moisture. Almost

every case of intermittent fever in the Edinburgh Infirmary used to commence with these words. "An old Soldier; was in the unfortunate expedition to Walcheren; has ever since on exposure to damp and moisture been subject to attacks of ague;" this too, in men, who had resided in Britain, ever since that expedition! I naturally come to the conclusion, that the climate in the Himalyah mountains cannot be considered as unhealthy in the rainy season, although it may not be deemed equally sanitary, as at other seasons of the year. It would be well worth the trouble to ascertain, in the comparative result of practice in an hospital in Britain (Chatham for example), where men are received for diseases contracted in the West Indies, and I may be allowed to express my doubts, whether it would prove equally favorable even with the advantage, which the patients in the latter have of a previous sea voyage. The above remarks are confirmed by the experience of one of the most zealous members of the profession, and whose experience has been most extensive. I allude to Dr. Robertson, who has had medical charge of the Sanitarium, for a number of years.

NOTE.—Dr. Murray, Assistant Surgeon, was John Murray, M.A. Mar. Coll. Abd. 1828, M.D.Edin. 1831, who became Inspector-General of Hospitals, I.M.S (Bengal), and from 1865 to 1871 occupied the position now known as Director-General, Indian Medical Service.

Mr. Superintending Surgeon Playfair was George Playfair, who retired as an Inspector-General of Hospitals, H.E.I.C.S. (Bengal), March 1, 1843. He was the father of Sir Lyon Playfair, some time Professor of Chemistry in the University of Edinburgh, afterwards M.P., who was created a Peer (Baron Playfair, of St. Andrews) in 1892, and grandfather of Brigadier-General Lord Playfair, C.V.O., late Royal Artillery.

Reviews.

Manual of Tropical Medicine. By Aldo Castellani, M.D., and Albert J. Chalmers, M.D., F.R.C.S. London: Baillière, Tindall and Cox. Second Edition. 1913. Fifteen coloured plates. Pp. xxxii and 1747. Price 21s. net.

The rapid growth of knowledge of tropical medicine within recent years is brought home to us by the fact that this admirable work, which represented the last word on the subject when the first edition appeared three years ago, has required the addition of just five hundred pages—nearly half its original volume—to bring it up to date in 1913.

The authors are to be congratulated on their success in coping with the mass of new material to be dealt with. We cannot but admire the comprehensive nature of their work. All students of tropical medicine will welcome the excellent preliminary articles on tropical climatology, the effects of climate and food on man, tropical intoxications and poisons, venomous animals, &c., and especially that on tropical races, a subject of the highest importance to medical men working in the Tropics. We could have wished that this article had dealt a little more fully with cultural, as opposed to archæological anthropology. The latter is of high importance, but we regard a familiarity with the customs and beliefs of primitive tribes as invaluable to a doctor whose duty it is to gain the confidence and friendship of the people among whom his lot is cast. We would venture to suggest the inclusion of "Notes and Queries in Anthropology," amongst the references to this subject in some future edition. This little publication of the Royal Anthropological Institute gives a useful basis for inquiry into the manners, customs, and beliefs of native races, and opens up a field of the greatest utility as well as interest to workers in the Tropics.

We turn naturally to those diseases which have received the greatest amount of attention in recent years. With regard to the trypanosomiases, the authors find confirmation of their belief in the plurality of the species of the trypanosomes affecting man in Africa in the discovery of *T. rhodesiense* (Stephens and Fantham), and they consider that there are probably still other species concealed under the name of *T. gambiense*. They note, too, the possibility that some of the trypanosomes of the lower animals may be found to cause human trypanosomiases, and cite the case of Professor Lanfranchi who became infected in Europe with a laboratory strain believed to be *T. brucei*. The subject of South American trypanosomiasis is treated much more fully than in the first edition, and two excellent figures (after Vianna) showing *T. cruzi* in neuroglia cells of the brain, are added.

With regard to leprosy, the work of Bayon with the Kedrowsky strain is quoted by the authors as opening up the most promising field for future research. We welcome this expression of opinion, as we consider that the serological evidence produced by Bayon gives his theory a claim to the very greatest attention.

The discovery that *Leishmania infantum* is widely distributed in Southern Europe demonstrated the importance to medicine in general of the careful study of tropical diseases, and we have in pellagra yet another dramatic instance of the same thing. The six pages devoted to this subject in the first edition have given place to thirty-seven in the second, and the half-dozen lines indicating that Sambon had suggested that the disease might be due to a parasitic protozoon, have grown into a long and appreciative review of Sambon's theory that the causative agent is a protozoon spread from man to man by a biting fly. It is natural that this theory should receive great attention in the work under review, as one of the authors has been so intimately associated with Sambon in his epidemiological researches. We recall how unshaken were our convictions in favour of the maize theory when first we heard that Sambon had suggested that pellagra might be caused by a protozoon. After all, Teufelsdröck is right. "Custom," says the Professor, "doth make dotards of us all." It is so easy to settle down to a widely-held conviction, and so humiliating to find it slide away from under us and leave us apologetically accepting a new idea. Every day brings to light fresh evidence in favour of Sambon's induction and against the maize theory, and we can only congratulate that distinguished worker and his colleague, Dr. Chalmers, on their success.

Beri-beri claims a greater space than formerly, and the article on this disease contains much new matter.

We turn to blackwater fever with great interest, but are still faced with an unsolved problem. The authors continue in their opinion that it is a "disease of its own," and go further in affirming their belief that it is due to some as yet unknown protozoal parasite. We cannot help thinking that they dismiss Stephens' theory too lightly, and we find no mention of the masterly work of Deek and James in the Panama Canal zone.

Under the heading of the dysenteries, we find an excellent table, showing the cultural reactions of "certain aerobic intestinal bacteria, with names arranged in alphabetical order." This table should be of special value to Army medical officers engaged in laboratory work, as these aerobic intestinal bacteria probably cause more illness and inefficiency during military operations than all the other parasitic causes of disease together.

Our review would assume very large proportions if we attempted to do justice to our subject. We have a duty to our Editor as well as to the authors, and it is not only a question of our time but of his space. We have deliberately selected for attention the diseases themselves rather than their parasitic causative agents, as the practical question of clinical work in the Tropics makes a wider appeal than the more technical aspects of tropical entomology; but the most important part of the work is undoubtedly the magnificent section dealing with the parasitic causes of disease. We do not feel competent to criticise it. We can only express our gratitude for a comprehensive and thorough summary of a most difficult subject, which will be of the greatest assistance to us personally, and, without doubt, to many others.

S. L. C.

PRACTICAL BACTERIOLOGY, MICROBIOLOGY AND SERUM THERAPY. By A. Besson. Translated by H. J. Hutchens, D.S.O., M.R.C P. &c. London: Longmans, Green and Co. 1913. Pp. xxx and 892. Price 36s. net.

Those who are acquainted with Dr. Besson's "Technique Microbiologique" will welcome an English translation of that excellent work, and Professor Hutchens is to be congratulated on his success in what must have been a very difficult task. For this is no mere literal translation. It is rather the adaptation of a book written entirely in the spirit of the French school of medical thought to the needs of the British medical public. It may be objected that there is only one real school of medical opinion, that of Europe and America, and that to take into consideration the local differences is to emphazise what ought to be ignored, but it is only necessary to compare the original "Besson" with that now under review to realize that much careful revision and much judicious addition and subtraction have been needed to convert a popular French textbook into one likely to enjoy great popularity in this country. The actual text of the original has been adhered to with what might be called tenacity; but it has evidently cost the translator something to keep his interpolations inside their brackets. It is difficult to avoid drawing comparisons between the translation and the original, for in spite of the fidelity of his attempt to be only a translator, Professor Hutchens has somehow failed to suppress his own personality and has given us what might be best described as a collaboration with the author, rather than a mere rendering into English of his original work. However arrived at, the result is excellent. In no other work with which we are acquainted is the arrangement of the bacteria more convenient for the purposes of description and reference. In this respect the present volume is a decided improvement on the French edition. The comprehensive article on the tubercle bacillus is greatly improved by the inclusion of many of the results of the Royal Commission on Tuberculosis and by several new text figures and photographs. The articles on the paratyphoid bacilli have been re-written in view of the work of the Royal Army Medical Corps in India, and of Bainbridge in this country, and the three chapters dealing with this subject form a useful summary that was much needed. The opening pages on the *Bacillus febris entericæ* might have been more thoroughly overhauled. The statement, quoted from Courmont, that in all cases of moderate and severe infection the organism can be isolated from the blood from the fifth day until the end of the third week of the disease, misses the essential fact that it is just in the first five days that blood culture gives the highest percentage of successes, while the recovery of the bacillus after the second week is exceptional unless a relapse has occurred. We regret, too, the assertion that the typhoid bacillus lives a saprophytic existence in the intestines of healthy persons. It lives a parasitic existence in the tissues of typhoid carriers, a very different thing. There are a few slight errors in translation, or perhaps rather in expression of the meaning of the original. For instance, "Netter . . . showed that during the early stages of the disease the pneumococcus in the saliva . . . was virulent, that it disappeared at the time of the crisis, and reappeared at the end of a fortnight." This is not exactly the same as "Netter a constaté que, pendant la pneumonie,

le pneumocoque de la salive est virulent; cette virulence disparait au moment de la crise pour se manifester de nouveau au bout d'une quinzaine de jours." It is the virulence that disappears, not the pneumococcus. But such minor points only await correction in a subsequent edition. In our opinion a more serious fault is the absence of a bibliography or at least of any systematic arrangement of references. Many authorities are quoted without any guide as to where to look up the original papers. The addition of good references would raise this fine work to the very highest level. As it stands, it is, in many respects, an advance on most of the textbooks available, and both the author and the translator are to be heartily congratulated on a successful work. We could have wished that the externals of the volume had retained the simplicity of the original with the resultant diminution in price, but we recommend those in want of a thoroughly sound book on bacteriology to possess themselves of the English edition, cover and all.

S. L. C.

PREVENTIVE MEDICINE AND HYGIENE. By Milton J. Rosenau. New York and London: D. Appleton and Co., 1913. Pp. xxviii and 1074.

This volume is an up-to-date textbook of preventive medicine and hygiene, in which Professor Rosenau has successfully covered the wide field of medical and related sciences which form the foundation of public health work. Many facts have been here brought together which are widely scattered in the literature of the subject and which are often difficult of access, and on them is shed the light of the author's wide and varied experience in hygiene and sanitation. In addition, the book is a compilation of facts gleaned from the standard works of other writers on the subject in England, the Continent, and America.

The scope of the work is given thus in the preface: "The book may be considered in two parts, namely, that which deals with the person (hygiene), and that which deals with the environment (sanitation). The first part includes the prevention of the communicable diseases, venereal prophylaxis, heredity, immunity, eugenics and similar subjects. The second part deals with our environment in its relation to health and disease, and includes a discussion on food, water, air, soil, disposal of wastes, vital statistics, diseases of occupation, industrial hygiene, school hygiene, disinfection, quarantine, isolation, and other topics of sanitary importance, as well as subjects of interest to health officers." The chapter on sewage and garbage has been written by G. C. Whipple, that on vital statistics by Cressy L. Wilbur, and that on the prevention of mental diseases, by T. W. Salmon. The section on communicable diseases is noteworthy, the diseases being grouped according to their mode of transference. This classification is a new one and should prove of assistance to those who are specially concerned in the prevention of infection. The remainder of the book is arranged in the approved textbook style, and the usual analytical methods are described in the sections on water, air, and food. The section on immunity, heredity, and eugenics is one not usually found in textbooks on hygiene, and is a welcome addition. We can confidently commend this book to the perusal

not only of students of public health, but also to medical officers in all parts of the world who are concerned in disease prevention.

H. B. F.

THE REDUCTION OF DOMESTIC FLIES. By Edward Halford Ross, M.R.C.S.Eng., L.R.C.P.Lond. London: John Murray, 1913. Pp. viii and 103. Price 5s.

In this book the author has made a determined effort to bring home to the public the necessity for the campaign against house flies. The fly and its life habits are well described, and the book is profusely illustrated with some excellent photographs of flies and their larvæ. It is written with some humour and in strong and forcible language, no point of evidence which would assist in damning the fly having been omitted.

The destruction of fly larvæ and sanitary measures for fly prevention are fully dealt with, municipal action in these matters being strongly recommended. A short chapter is devoted to the fly's enemies, but the substitution of *Empusca medusæ* for *Empusa muscæ* as a name for the fly fungus, is an extraordinary mistake for one so well versed in the subject. The book is evidently written for the lay reader and not for members of the medical profession, therefore we may excuse those passages in which the author has been inclined to exaggerate the importance of the fly in the causation of certain diseases. For the same reason we are not inclined to cavil at some of his scientifically inaccurate statements, such as that flies were the sole cause of the increase of infant mortality in July, 1911, and that dairies and cowsheds are dangerous establishments.

Much good would be done if this book were widely read by the lay public, and it could not fail to bring home to the householder his responsibility for the presence of flies in his kitchen, larder, and dining-room.

H. B. F.

STUDIES ON THE INFLUENCE OF THE THERMAL ENVIRONMENT ON THE CIRCULATION AND BODY HEAT. By Edgar R. Lyth, M.B. Durham, M.R.C.S.Eng. London: Bale, Sons and Danielsson, 1913. Pp. viii and 72. Price 2s. 6d. net.

In this small book are embodied the results of a large number of experiments on the changes that occur in the circulatory system, and in the body heat, consequent on alterations in the thermal environment.

The author takes for the basis of his experiments three subjective conditions which he refers to as "the hot condition," "the cold condition," and "the neutral condition." In "the hot and cold conditions" the subject is said to feel uncomfortably hot and cold respectively, while "the neutral condition" is a thermally comfortable state between the two. The alterations found in the internal temperature consequent on changes in the thermal environment are of particular interest to military medical officers who frequently see patients suffering from heat retention. One point that we consider is clearly made out by these experiments, is

the necessity, in cases of heat stroke, of observing both the internal and external temperatures of the body as a guide to treatment.

The author draws our attention to many facts that are not generally known, such as the rise in the internal temperature consequent on exposure of the body to cold when in "the neutral condition," and the subsequent fall when the exposure is discontinued. The observations on the alterations in the blood-pressure should prove of great value in directing the lines of treatment of aneurism and of many affections of the heart and kidneys.

It would be impossible in a short review to touch on the many interesting points brought out by these experiments. We can confidently recommend the book as likely to prove of great value to those interested in the study of heat retention.

W. W. O. B.

Current Literature.

Strains of Syphilitic Virus.—Pick (*Wien. med. Woch.*, September 13, 1913, p. 2390) discusses the effect on the prognosis of the source of the syphilitic infection. Malignant syphilis, which is characterized by the early appearance of what are usually late symptoms, and by the tendency of the lesions to ulcerate, is comparatively rare. Gennerich reports the case of two sailors who contracted the disease from the same woman, in which the malady pursued a malignant course in both. On the other hand, there are many observations of a pernicious infection arising from a benign or ordinary case, more especially in persons debilitated by alcohol, malaria, tubercle, diabetes or starvation.

There is a considerable amount of evidence that there is a syphilitic virus which has a special affinity for the cerebrospinal system. Brosius records the case of a glass-blower who infected seven of his fellow-workers. Two developed general paralysis, and two tabes.

Mendel quotes the instance of a man dying of general paralysis. His widow and her second husband became ataxic. According to Nonne, of three men who were infected by the same woman on the same night, two died of general paralysis, and one of locomotor ataxy; a child infected its mother who transmitted the disease to her husband. All three succumbed to tabes. Erb narrates how five men fell victims to general paralysis or ataxy, after exposure to the same source of infection. Pick observed the occurrence of general paralysis and tabes in two brothers who were infected on the same night by the same woman. Regis relates how a man infected his wife and sister-in-law. All died of general paralysis. According to Junius and Arndt, a man lost his wife from tabes; his second wife also developed this disease. He, himself, and his daughter died of general paralysis. Morel-Lavallée quotes the case of five men who died of general paralysis; all contracted syphilis from the same woman.

The Prague statistics for the years 1879-1899 show that metasyphilis attacked 3·7 per cent of infected men; 10·5 per cent of the husbands of women who died of general paralysis succumbed to this form of cerebral syphilis. Hence this also suggests that there is a neurophile luetic virus.

C. B.

Outbreak of Food Poisoning.—Three hundred and forty-nine soldiers out of a total strength of 883 were attacked with colic, vomiting and diarrhœa, after partaking of food which probably had been infected with *Bacillus paratyphosus* B. In some cases there was mild pyrexia for two or three days. Recovery ensued in every instance. Otto (*Berl. klin. Woch.*, October 6, 1913, p. 1859) thinks that the food was contaminated after cooking. The *B. paratyphosus* B was isolated from the fæces of some of those affected. The serum reaction with this micro-organism was positive in 90 per cent of the cases.

C. B.

The Etiology of Relapse in Malarial Infections.—W. M. James, writing in the *Journal of Infectious Diseases*, vol. xii, No. 3, May, 1913, discusses the etiology of relapse in malarial infections and comes to the following conclusions: If the hypothesis be accepted that the asexual cycle alone is the cause of relapse and under certain conditions takes on a relative immunity against quinine, an explanation is afforded of all the factors concerned. The factors in relation to the asexual cycle are:—

(1) Relapse is one of the most common factors in malaria infection, and the asexual cycle is that phase in the life-history of the malaria parasites most frequently associated with the primary infection and with the relapse, and with one relapse and the succeeding one.

(2) Relapse frequently follows the so-called spontaneous cure of malaria, because the asexual cycle in such a case often persists in numbers that can be detected by the thick film method in the intervals of apyrexia.

(3) Infections treated with small doses of quinine will in all probability relapse, because the parasites of the asexual cycle in the spleen and marrow are very slightly if at all affected thereby.

(4) Relapse is less likely to occur when the infection is promptly and vigorously treated, because the older the asexual cycle the more resistant to quinine it becomes.

(5) When a relapse occurs with the presence of parasites in the peripheral blood during the administration of quinine by the mouth in sufficient doses, faulty absorption of the drug is sure to exist.

(6) The asexual generation does not have an unlimited vitality. If death does not supervene in the course of a malaria infection the infection itself will die out in time, but often not until it has done irreparable damage.

The hypothesis also explains the two factors in the life-cycle of the parasites, which are intimately connected with the etiology of relapse, because (*a*) quinine given by the mouth very often does not eradicate the asexual cycle in the spleen and bone marrow and the residual

parasites become immune, and (*b*) the longer the asexual cycle persists, the more easily it acquires immunity against the drug.

The practical importance of the hypothesis lies in the value it has as a guide to the treatment of malaria. Small doses of quinine, even in the mildest infections, serve only to render the asexual cycle relatively immune, so that larger doses, which, if they had been given early in the attack might have eradicated the parasites, are later without effect.

James states the above hypothesis has been found to be true by the clinical experience in the Ancon Hospital, Canal Zone, and that now a routine treatment of 15 gr. quinine sulphate three times daily has practically eradicated recurrent malaria among the Americans, and to a large extent among the European labourers. The latter, however, treat mild infections with small doses and so produce an asexual cycle, relatively immune to quinine, that is more difficult to eradicate.

O. L. R.

An Investigation of the Prevalence of Trachoma in the State of Minnesota, U.S.A.—Taliaferro Clark ("Reprint No. 134, Public Health Reports," June, 1913, Washington, U.S.A.)—The undue prevalence of trachoma among Indians of Minnesota and other States was brought to notice in 1912. The United States Public Health Service made three very extensive surveys which embraced all elements of the population at points widely separated and also included an examination of school children, public and parochial, at various points within the State, students of agricultural schools, and inmates of various State penal and reformatory institutions.

Within the last twelve months the author examined 52,847 persons of all classes, including Indians, and found 610 cases of active trachoma, 1·14 per cent. There were seventy-seven cases among 99,305 white people in comparison with 533 cases among 3,542 Indians.

The consensus of opinion expressed by older Indians was to the effect that trachoma is a disease of comparatively recent introduction among them; and that the disease was introduced among the Chippewas by trappers and lumbermen and that it did not exist among them prior to the advent of the white man.

The Indian appears to be peculiarly susceptible to the disease, and the principal causes of the spread among them are their habits, their dwellings and indifference to treatment.

The late effects of trachoma are grave visual defects which may eventually end in blindness. Out of 2,582 Reservation Indians, nineteen were blind from trachoma, and forty-one had marked injury to vision. The percentage of trachoma, 2·37, among the miners of the Mesaba range was found to be second to that among Indians, 15·04 per cent. Nearly all the cases of trachoma found among miners were of recent origin, which indicates the existence of widely scattered foci of infection in the mining region, rather than the recent importation of cases.

The report concludes with many recommendations, such as notification and quarantine, exclusion of actual cases from schools, medical treatment, separate schools, and many more, which serve to show that the disease is looked upon as a considerable source of danger to the State.

W. W. O. B.

Extract from Report of the Department of Sanitation of the Isthmian Canal Commission for the Month of June, 1913:—

Sanitation.—Canal Zone.

. . . . . .

"In accordance with previously considered plans, many miles of natural streams and ditches have been lined with concrete during the past dry season. More recently the plan adopted was to make this lining only about an inch thick, reinforced at the centre with poultry wire. Such construction has given satisfactory service and the smaller cross section, reducing the cost per linear foot, has enabled more work of this character to be accomplished."

. . . . . .

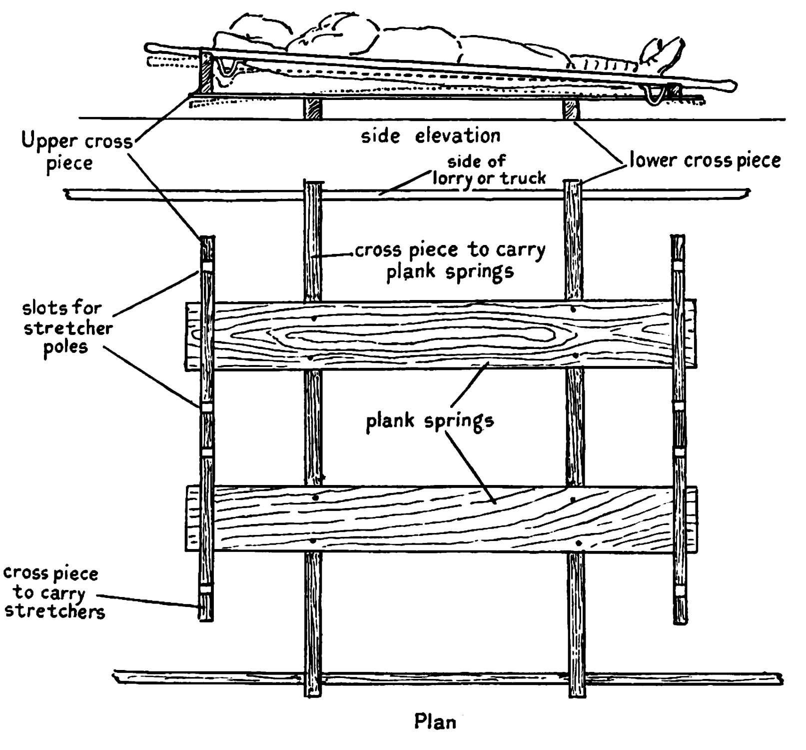
Spontaneous Fractures in Soldiers.—Stabsarzt Dr. W. Wolf (*Deut. militärärzt. Zeit.*, July 20, 1913) discusses the occurrence of spontaneous fractures in soldiers. He quotes a number of cases to support his view that these fractures occur as the result of periostitis, caused by excessive muscular action. Wolf thinks that the local periostitis interferes with the blood supply of the part and so predisposes it to break under a relatively slight strain, e.g., a long march while carrying the full field service equipment. C. E. P.

Thymol Alcohol as a Skin Disinfectant.—Stabsarzt Dr. Koehler (*Deut. militärärzt. Zeit.*, August 20, 1913) advocates the use of thymol alcohol, prepared by dissolving 5 per cent of thymol in spirit containing 60 per cent pure alcohol, in place of tincture of iodine, as a skin disinfectant before performing an operation. The solution should be used in the same way as tincture of iodine. He claims that thymol alcohol is quite as efficient as tincture of iodine and has the following advantages: It does not give rise to any irritation of the skin; it is colourless and does not therefore obscure the clinical picture; it does not soil linen; its cost is roughly half that of tincture of iodine; it can be kept in store for long periods without undergoing any change and need not therefore be freshly prepared for use in the field. Thymol alcohol has been used as a skin disinfectant for the last three years in Professor König's surgical clinic in the University of Greifswald. C. E. P.

Mastisol in the Balkan Campaign.—Stierlin and Vischer (*Correspondenz-Blatt f. Schweiz. Aerzte*, No. 19, 1913, p. 588) speak very highly of the use of mastisol in dressing wounds. They first used it in the general hospital at Belgrade for non-suppurating wounds; later on they used it at Uskub and again when employed in a dressing station with the Morava Division during the fighting at Monastir. Their method of using mastisol was as follows: A number of 5-in. squares of stout cotton twill were prepared; these were not sterile. The skin round the wound was painted with mastisol and a small pad of sterile vioform gauze was placed on the wound; one of the cotton squares was then pressed firmly on to the painted area, where it was securely fixed by the mastisol. None of these dressings shifted during the long and rough journey, mainly by cart, to the base, and all the wounds healed without complications. The

composition of the mastisol was: Mastiche, 40 grm.; benzol, 100 grm.; ol. lini., 40 drops. They also used mastisol for fixing extension apparatus. Wounds dressed with balsam of Peru did not do well. C. E. P.

Deterioration of Knapsacks owing to an Excess of Magnesium Salts in the Hide.—Oberstabsapotheker Dr. H. Strunk (*Veröffentlichungen aus dem Gebiete des Militär-Sanitätswesens*, Heft 55). A number of knapsacks in store were found to be badly damaged; the iron buckles had become deeply corroded, brass parts were covered with a layer of verdigris and the cloth lining and leather straps had perished in places. Chemical analysis showed that the calfskin used in manufacturing the knapsacks contained an excess of mineral salts and free sulphuric acid. From this it appears probable that the fresh skins had been salted and that this salt had not been properly washed out before the skins were tanned. The high proportion of magnesium salts also suggests that a very inferior salt had been used in the first place. C. E. P.



Scale ½ inch to 1 foot

A New Spring System for Transport of Wounded (By Professor Dr. Kimmle, from *Das Rote Kreutz*, October 12, 1913).—This contrivance, as will be seen from the diagram, consists of cross-bars and planks; the

planks are of such thickness that under shock they will yield to the weight of the stretchers and patients, and their thickness and width must be suited to this purpose.

The apparatus is designed for carrying patients on stretchers, and may be used in farm wagons, motor lorries, or railway trucks. If the ends of the lower cross-pieces are placed on the edges of the sides of the vehicles additional spring is given, if the cross-pieces are laid on the floor the spring of the lower cross-pieces is lost. In the former method there are three sources of resiliency, viz., stretcher-poles, planks, and lower cross-pieces. The apparatus is made from wood of ordinary scantling, such as will be found in builders' yards. The planks, if of fir wood should be 10 in. wide and between $\frac{1}{2}$ in. and $\frac{3}{4}$ in. thick; if of oak or ash, $\frac{1}{2}$ in. planks may be used. They are nailed by not more than two nails (otherwise the wood is weakened) at each point where they lie on the lower cross-pieces. The upper cross-pieces which carry the stretchers are slotted to receive the stretcher-poles. They are nailed to the planks from below with long nails. The head-end upper cross-piece must be made so high that there is no possibility of the centre of the plank touching the loaded stretcher when the spring is in tension. The lower cross-pieces must be placed near enough together to give the maximum amount of spring, with due regard to the equilibrium of the stretcher. If placed too close together the end of the stretcher might tip up. The tools required are a saw, a hammer or hatchet, and a bradawl or gimlet.

H. E. R. J.

In **Bulletin No. 3** (**Studies of Syphilis**) issued by the Surgeon-General U.S. Army, Major H. F. Russel gives some interesting figures which illustrate the economic value of present-day methods of treating syphilis. Thus, although the admission rate for this disease in the U.S. Army had risen from 13·6 in 1893 to 24·5 in 1912, the constantly sick rate had risen only from 1·68 to 1·7, and the invaliding rate had fallen from 1·59 to 0·61. The reduction in the constantly sick rate was most marked in 1912, having varied from 2·17 to 2·88 during the years 1904 to 1911. The reduction in the invaliding rate was most marked in 1911, being 0·52 in that year as compared with a previously lowest of 1·13 in 1910. It should be mentioned that in the years 1911 and 1912 salvarsan was very widely employed in the U.S. Army, having been used by 224 officers for the treatment of 5,709 cases.

The same Bulletin also contains papers by Captains Craig and Nichols on what may be termed the laboratory diagnosis and control of syphilis and on salvarsan treatment. The former contains a great amount of technical matter and embodies the results of much original research, for the details of which the original should be consulted. An interesting discovery by Craig and Nichols is the effect of ingestion of alcohol by the patient on his positively reacting serum. They carried out a series of tests on the serum of nine patients, all of whom gave strongly positive reactions, and found in each case that on the day after the patient had taken 700 c.c. of Munich beer, 240 c.c. of whisky, or (in one case) 90 c.c. of 95 per cent alcohol, the reaction had become negative. In two cases the blood was tested two hours after the ingestion of alcohol and found to be already negative, while in three others tested half to one hour after,

it was already either negative or considerably weaker. In each case the reaction returned in a few days to its former strength. Craig, judging salvarsan from the point of view of the Wassermann test, found that a very high percentage (86·8) of the cases treated with salvarsan relapsed. The great majority of these had received only one or two intravenous injections, without apparently any mercurial treatment. He concludes that each patient should receive a minimum of three or four salvarsan injections and an intensive mercurial treatment. In a concluding paper Nichols lays down a standard of cure and a plan of treatment. The standard of cure requires one year without clinical signs, several negative Wassermann reactions and no positive ones, as well as a negative Wassermann reaction after a provocative test, and a negative luetin test at the end of a year from the date of the last treatment. The plan of treatment distinguishes between primary cases with a negative Wassermann reaction and those with a positive reaction, and, again, between primary and secondary. For the first of these he recommends two full doses of salvarsan (or neosalvarsan) with an interval of one week, one month of intensive treatment with mercury by injection or inunction, and excision of the chancre whenever possible. When the Wassermann reaction has already become positive three full doses of salvarsan at weekly intervals and six weeks' mercurial treatment should be given, and in the secondary stage, four to six full doses of salvarsan in two months, with intensive mercurial treatment.

Throughout the Bulletin frequent emphasis is laid on the necessity for early diagnosis and treatment.

L. W. H.

Correspondence.

A COLLECTION OF ORDERS AND MEDALS FOR THE ROYAL ARMY MEDICAL CORPS MESS, LONDON.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have thought for a long time that a collection of "Orders and Medals" would form an object of great interest in our London mess. Many brother officers, both on the retired list and still serving, may desire to present something to their head mess, but are deterred perhaps by the price of a suitable piece of plate. A medal need not be costly, and would be definite proof of their interest in their mess. A record would, of course, be kept of donors and their gifts. As the suggestor of the idea, I shall be delighted to make a beginning.

I am, &c.,
A. B. COTTELL,
Lieutenant-Colonel (*Retired*).

November 21, 1913.

INDEX TO VOLUME XXI.

C.N. = Clinical and other Notes.
C.L. = Current Literature.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

July, 1913.

HONOURS.

The King has been graciously pleased, on the occasion of His Majesty's birthday, to give orders for the following appointments:—

To be Ordinary Member of the Military Division of the Third Class, or Companion of the Most Honourable Order of the Bath, Surgeon-General Louis Edward Anderson, Deputy Director of Medical Services, Ireland.

To be a Companion of the Most Eminent Order of the Indian Empire: Major Robert James Blackham, R.A.M.C., commanding the Station Hospital, Jutogh.

His Majesty has been further pleased to confer the honour of Knighthood upon Major Edward Scott Worthington, M.V.O., R.A.M.C.

CAVALRY—1st LIFE GUARDS.—Surgeon-Lieutenant Hubert C. G. Pedler resigns his commission, dated May 28, 1913.

Ernest Deane Anderson to be Surgeon-Lieutenant, *vice* H. C. G. Pedler, resigned, dated June 4, 1913.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Thomas E. Noding is placed on retired pay, dated May 25, 1913. Lieutenant-Colonel Noding entered the Service as a Surgeon, Army Medical Department, July 30, 1881; became Surgeon-Major, Army Medical Staff, July 30, 1893; Lieutenant-Colonel, Royal Army Medical Corps, July 30, 1901; Lieutenant-Colonel with increased pay, April 19, 1907. His war service is: Egyptian Expedition, 1882. Medal; bronze star. Waziristan Expedition, 1894-95. Medal with clasp.

The undermentioned Majors to be Lieutenant-Colonels: Charles Dalton *vice* J. J. C. Donnet, retired, dated May 7, 1913. Oliver L. Robinson, *vice* T. E. Noding, retired, dated May 25, 1913.

The undermentioned Captains to be Majors: Ernest G. Ffrench, M.B., dated May 28, 1913. Andrew McMunn, dated June 25, 1913.

Captain Horace H. Kiddle, half-pay list, retires, receiving a gratuity, dated June 25, 1913.

Quartermaster and Honorary Captain Richard Scott retires on retired pay, dated June 4, 1913.

HIGHER RATE OF PAY.—Lieutenant-Colonel C. H. Burtchaell has been selected for the increased pay under Article 317 of the Royal Warrant for pay and promotion.

ARRIVAL HOME FOR DUTY.—Major H. S. Thurston from Malta, on May 23 (by exchange). Captain N. E. J. Harding from West Africa, on June 7. Lieutenant-Colonel R. Caldwell and Captain G. S. Parkinson from South Africa, on June 12. Captain A. M. Pollard, on June 19.

ARRIVALS HOME ON LEAVE.—Colonel J. M. Irwin; Lieutenant-Colonel T. B. Beach; Majors F. J. Palmer, E. E. Ellery, J. Powell, and H. F. Shea; Captains T. McC. Phillips, C. M. Rigby, and J. R. Yourell; Quartermaster and Honorary Captain A. J. Chalk.

POSTINGS.—To the Southern Command: Lieutenant-Colonel R. Caldwell. To the Irish Command: Major H. S. Thurston. To the London District: Major T. F. Ritchie. To the Eastern Command: Captain A. M. Pollard. To the Scottish Command: Captain C. S. Parkinson.

TRANSFER.—To Aldershot: Lieutenant-Colonel J. Thomson, from the London district. To the London District: Major W. A. Ward, from the Southern Command.

APPOINTMENT.—Lieutenant-Colonel J. Thomson, officer in charge of Records, Royal Army Medical Corps.

RETIRED PAY APPOINTMENT.—Major A. J. Chambers, Medical Charge at Lichfield City.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names: Major N. J. C. Rutherford, the Diploma in Public Health of the Royal Colleges of Physicians and Surgeons in Ireland. Captain M. F. Grant, M.D., University of Cambridge.

EMBARKATION. — *For West Africa:* On June 26, Captain R. R. Lewis.

RESULTS OF EXAMINATIONS.—The following results of examinations are notified for general information:—

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (*b*): Captains D. G. Carmichael, D. P. Watson, H. C. Hildreth, M. Sinclair, P. A. Lloyd-Jones, L. V. Thurston, R. K. White, A. E. S. Irvine, W. J. Weston, G. De la Cour, P. Sampson, and M. P. Leahy.

In Appendix xi, K.R., Subhead (*c*): Captains J. Fairbairn, R. J. Cahill, R. C. Hallowes, G. H. Rees and S. Field.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (*c*) ii: Lieutenants C. H. Stringer, and B. H. H. Spence.

ROSTER FOR SERVICE ABROAD.—Major G. B. Crisp has exchanged to a higher position on the roster with Major W. M. B. Sparkes.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

PROMOTIONS.

		LANCE-CORPORALS.		
73	Private ..	Ellard, F... ..	5.5.13	Special under para. 281 Standing Orders.
1051	,, ..	Davey, W. H. ..	8.5.13	Special under para. 281 Standing Orders.
1974	,, ..	Ferguson, C. D. ..	24.5.13	Special under para. 281 Standing Orders.

DISCHARGES.

8223	Sjt.-Major	How, S. J.	2.6.13	Having reached the age limit.
8270	Qmr.-Serjt.	Jones, F. L. M. ..	12.6.13	Medically unfit.
9691	,,	Arnold, G.	20.6.13	Termination of second period.
8564	S.-Serjt. ..	Howell, G. A. ..	4.6.13	After 3 months' notice.
10548	,, ..	Smith, J. H. ..	15.6.13	Medically unfit.
15737	Corporal ..	Thompson, A. E. ..	28.5.13	Termination of first period.
15786	,, ..	Collins, H. E. C. ..	13.6.13	,, ,, ,,
705	Private ..	Sinclair, J. W. ..	12.4.13	Payment of £18.
7100	,, ..	Driscoll, R. L. ..	16.5.13	,, £10.
6928	,, ..	Barker, A. B. ..	17.5.13	,, £10.
15714	,, ..	Hawarden, J. ..	20.5.13	Termination of first period.
19627	,, ..	Hedges, A. H. ..	29.5.13	Medically unfit.
19644	,, ..	Stevenson, G. E. ..	12.6.13	At own request after 18 years.
9439	,, ..	Nunn, W. J. ..	18.6.13	After 3 months' notice.
11593	,, ..	Bootes, T. L. ..	10.6.13	Free after 15 years.

TRANSFERS TO ARMY RESERVE.

252	Pte.	Berryman, G. ..	11.5.13	19625	Pte.	Wood, S. J. ..	29.5.13
5779	,,	Murphy, J. ..	9.5.13	4997	,,	Thomson, J. ..	2.6.13
4986	,,	Flood, J. J. ..	11.5.13	19629	,,	Cox, H. W. ..	31.5.13
19609	,,	Aldridge, F. J. ..	9.5.13	4815	,,	Williams, A. ..	1.6.13
4981	,,	Macdonald, J. ..	13.5.13	4813	,,	Usher, S. R. ..	1.6.13
4987	,,	Kelly, T. ..	16.5.13	2142	,,	Taylor, E. C. ..	3.6.13
4989	,,	Peppiatt, E. ..	17.5.13	291	,,	Melton, F. ..	6.6.13
4990	,,	Allerton, H. ..	18.5.13	4998	,,	Daltrey, H. ..	5.6.13
267	,,	Scammell, A. E.	22.5.13	5004	,,	Grey, C... ..	5.6.13
247	L.-Cpl.	O'Callaghan, J.J.	7.5.13	5000	,,	Liderth, J. ..	5.6.13
4992	Pte.	Petch, T. ..	22.5.13	5001	,,	Alexander, H. ..	6.6.13
4995	,,	Osbourne, J. ..	24.5.13	293	,,	Hanchett, G. ..	7.6.13
4994	,,	Beer, G. W. ..	24.5.13	298	,,	Bentley, A. W...	7.6.13
19623	,,	Stabler, J. ..	28.5.13	19640	L.-Cpl.	Hollands, G. H.	8.6.13
5257	,,	Penson, C. ..	24.5.13	5008	Pte.	Wyburn, W. ..	9.6.13
4996	,,	Mortimer, E.G.V.	24.5.13	5006	,,	Cronley, A. C. ..	9.6.13
738	,,	Ryan, M. ..	6.6.13	303	,,	Hicks, F. ..	10.6.13
5021	,,	Johns, A. F. ..	31.5.13	19648	,,	Stirling, F. ..	14.6.13
935	Corpl.	Griffith-Williams, H. M.	6.6.13				

TRANSFERS TO OTHER CORPS.

12391	Serjeant ..	Ogden, H.	16.5.13	To Colonial Government.
18018	,, ..	Phipps, F. S. ..	21.5.13	,, ,, ,,
391	Corporal ..	Scorey, W. J. ..	21.5.13	,, ,, ,,
1836	Private ..	Edwards, W. J. ..	21.5.13	,, ,, ,,
7012	,, ..	Saunders, W. H. ..	13.5.13	,, Scottish Rifles.
6144	,, ..	Clayton, R. C. ..	18.5.13	,, A. S. Corps.
10581	S.-Serjeant	Warsop, H... ..	6.6.13	,, Dubl. Univ. O.T.C. Fd. Amb.
10861	Serjeant ..	Cleare, G.	7.6.13	,, School of Inst., R.A.M.C. T.F. No. 10 District.

TRANSFER FROM OTHER CORPS.

7156	Private ..	McFadyen, G.	19.5.13	From 2nd Batt. Highland L.I.

DEATHS.

5384	Private ..	Millins, G. P. ..	27.5.13	London	
18915	Act. S.-Maj.	Barrett, A. E. ..	6.6.13	Aberdeen	No. 2 Highland F.A., T.F.

DISEMBARKATIONS FROM ABROAD.

From South Africa, per s.s. "Dover Castle," May 20, 1913.

19098	Private ..	Burley, F. P.	1972	Private ..	Davidson, B.
1975	,, ..	Hawkes, W.	2259	,, ..	Wilson, S. W.
18988	Corporal ..	Haigh, R. H. T.	4777	,, ..	Ball, F.
1082	Private ..	McKeague, J.	17967	,, ..	Wren, C.

From South Africa, per s.s. "Garth Castle," May 29, 1913.

12987	Serjeant ..	Walter, B.			

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR QUARTERMASTER-SERJEANT.

11082	S.-Serjeant	Fraser, J.			

FOR STAFF-SERJEANT.

16002	Serjeant ..	Amsden, H. W.			

FOR SERJEANT.

12986	Lce.-Serjt.	Alexander, E.	19980	Corporal ..	Loder, H. J.

FOR CORPORAL.

1270	Private ..	Marrable, F. G.	5772	Private ..	Loft, A. C.
5402	,, ..	Sexton, P.	6494	,, ..	Hilary, T. O. J.
5669	,, ..	Clark, H.	1096	,, ..	Cooney, J. A.
5910	,, ..	McLeod, D.	585	,, ..	Webb, G. E. S.
12096	,, ..	Flynn, W.	5055	,, ..	Gray, H. C.
1861	,, ..	Simmons, J. C. R.	2264	,, ..	Blake, W. T. H.
5627	,, ..	Cross, B. R.			

NOTES FROM WOOLWICH.—Serjeant-Major R. H. Green writes:—

"*A Day at Oxford.*—My impressions of a day's outing at Oxford, which was arranged for the adults of the Royal Herbert Hospital (Woolwich) Choir, by the Army Chaplains and personally conducted by the Rev. C. A. Peacock, an old "undergrad" of St. Edmund Hall, or 'Teddy Hall,' as it is usually termed, and now a M.A.Oxon., may interest some of the Journal readers.

"After an express run on the Great Western, we arrived at Oxford about 10 a.m. Leaving the platform one could not help but notice the line of hansoms in the station yard, and once outside the station the plodding old horse-tram and the total absence of the motor bus and the 'taxi.'

"To our guide it seemed quite natural he should make for home (i.e., his old rooms in Teddy Hall), and there we followed him. Here he changed into cap and gown and it was very easy to notice the delight the change caused him. He was good for anything now and off we started '*on tour*,' and the pace he set us was that of an 'undergrad in a hurry.'

"Before starting, however, a peep into his old rooms showed us the limited space allowed the undergraduate, especially his bedroom accommodation. On a table in the study room stood the Teddy Hall Eights cup and an examination of this trophy showed that engraved on it was the name of our guide as the Captain of the boat in 1892 and 1893.

"After visiting the quaint little chapel and dining-hall we followed our leader to Magdalen College. The chapel here boasts a most beautiful painted window, the subject depicted being 'The expulsion of the fallen angels from Heaven.' As the sun plays on the window from outside the effect is marvellous and requires to be seen to be imagined.

"Among other items of interest at Magdalen we were shown H.R.H. the Prince of Wales' rooms, the quadrangle, Addison's Walk, and the open-air pulpit from which William of Wykeham used to preach and which is still used on occasions for public worship.

"Our next move was to New College, which, strange to say, has the only remains of the old city wall within its boundary. Like Magdalen, New College chapel has a beautiful painted window, the masterpiece of Sir Joshua Reynolds, the subject being 'The Nativity,' under which are several life-size figures representing Faith, Hope, Charity, Justice, &c., &c. The chapel also has a remarkable reredos, which was for a great number of years covered over with plaster, apparently forgotten, but subsequently discovered by accident when the wall was being repaired. It is composed of a large number of life-size sculptured figures of bygone bishops and prelates, each in an alcove, the whole presenting a unique appearance.

"The Muniment Room or Old Treasury was next brought to our notice. This is a sort of keep, and in the old days was strongly guarded by retainers on flights of stairs.

"From here we visited the Sheldonian Theatre and Divinity Hall, where the degrees are conferred. The peculiarities and customs associated with these two places are many and unique and would require much space to explain.

"The Bodleian Library was our next move, and here we might have spent an interesting week in studying the collection of manuscripts, prints, books, models, pictures (including the famous 'Unknown Lady,' and 'Mary Queen of Scots,') and other curiosities.

"From the Bodleian Library we were escorted to the 'Camera' or 'Rotunda' and mounting the winding staircase reached the roof, from which we obtained a bird's-eye view of the city and surrounding country. The sensation I experienced was similar to being on the dome of Musta Cathedral, in Malta, one of the largest in the world, though the surroundings differed.

"Away to Trinity College was our next 'trot,' and who could fail to be struck with the handsome ancient carving of the panellings of the College chapel walls?

"Balliol which boasts its music, St. John's its gardens, Exeter its sculptured figures, Jesus into whose courtyard you dare not step and call out 'Jones,' Brazenose with its athletes, Corpus Christi with its scholarships, Oriel its boat's crew, Christchurch with its magnificent old cathedral built by Cardinal Wolsey, its dining hall, the famous Tom Tower and its quadrangle of quadrangles, were all visited in turn and then we returned to our starting point, Teddy Hall, for lunch.

"By the extreme kindness of the Principal we were received as guests at lunch. Our guide again became an undergrad, at any rate to all appearance, and the mysteries of the 'Sconce' having been explained the college tankard was filled with the famous Oxford 'training beer' and passed round in the orthodox fashion. Teddy Hall has a high reputation amongst others for veal and ham pie and for its cold ham and beef, and well it deserves it, for, based on these, a more delicious lunch I do not remember.

"Lunch over, our guide allowed us but little time before we were off to see the 'Eights.' Here was a scene that could only be termed delightful. The Isis, with its stream of College barges on the one side and its hundreds of running enthusiasts, among them the Prince of Wales, on the tow path on the opposite side, shouting themselves hoarse, firing pistols, using megaphones and twirling those awful corncrake rattles, whilst in the centre were the struggling crews trying for all they were worth to reach the boat in front, only to 'bump,' but oh! what that bump meant if obtained. Here was a sight for those who have decried the manliness and pluck of British lads. To watch the enthusiasm of the youths on the success of their own college crews and in contrast the expressions of the supporters of the unfortunate 'bumped' ones was a study. In both cases the true English sporting feeling was evident and could not be disguised. Nor was the enthusiasm confined to the youths alone, for on all sides there were the 'old boys,' ranging in years up to sixty, perhaps over, as keen as ever on their college eights and apparently boys again for the time. During an interval between the races we found ourselves guests to tea on the Teddy Hall barge and found the 'undergrad' an excellent host as well as an oarsman.

"The races over we wended our way back to Magdalen Chapel, where permission had been obtained for our attendance at vespers and where we had a musical treat whilst listening to its noted and beautiful choir. The anthem was Mendelssohn's 'Oh! come let us worship,' and the way in which it was rendered will, I am sure, ever remain a memory with those who heard it.

"It was now nearly time to return, and we made for the station amongst the hundreds of folks all seemingly discussing the results of the day's racing and their probable effects on the finals.

"It would not be right to close the account of the incidents of the day without a note on the proverb that 'Honesty is the best policy,' as exhibited by the Oxford newspaper boy. One of our party, one of our chaplains at that, just as the train was moving off, called a newspaper boy, bought *The Star*, told the boy to keep the half-penny change and then settled down to scan the news—alas! only to find the paper was two days old. However this was only one incident amongst many others which went to make up one of the most amusing, instructive and enjoyable days I have ever spent, a day that left the impression that there can only be one Oxford in the world. These views I think I may safely say were fully shared by every one of our party of nine."

NOTES FROM CAIRO.—Corporal B. B. Bevan writes: "A very pleasant and interesting day was spent by the fortunate members of No. 33 Company who were not on duty on Whit Monday, at the Public Gardens in the Nile Barrage.

"Having donned our finest raiment we paraded outside the main entrance of the hospital about forty strong, which included ten men of the 1st Suffolks Band with their instruments.

"After calling the roll we wended our way past the astonished guard down the winding hill that led to the trams which were to take us to the station. On arriving at the station, everyone turned his attention to getting the refreshments aboard the carriage which had been specially reserved for the occasion.

"Crates of lemonade, boxes of linen, pies, &c., were rapidly stowed away in the luggage van, and we settled down in our seats, feeling satisfied that we were in good time and that nothing had been missed.

"Soon the train was in motion and we were being rapidly whirled away to our destination, which was, roughly speaking, about half an hour's run from Cairo northwards. It was very pleasant to lie back and feel that you were absolutely free from the monotonous routine of hospital life for just one day, and we all gave ourselves up to the bewitching hour. Gazing out across the irrigated lands we could see the fellaheen busy at their daily toil, here one ploughing his field with a pair of oxen and a wooden plough, farther on a native drawing water up by the shadeuf, women in their curious costume of baggy trousers and yashmak, wending their way from village to village in Indian file carrying huge bales of produce on their heads. Farther on we passed an overladen donkey struggling painfully along with a huge bundle of cotton, nothing visible of the donkey except his nose, tail and hoofs, and on the top perched a little native boy munching a sugar cane and alternately crying 'Ha—a—a!' accompanied by an occasional whack with a huge stick.

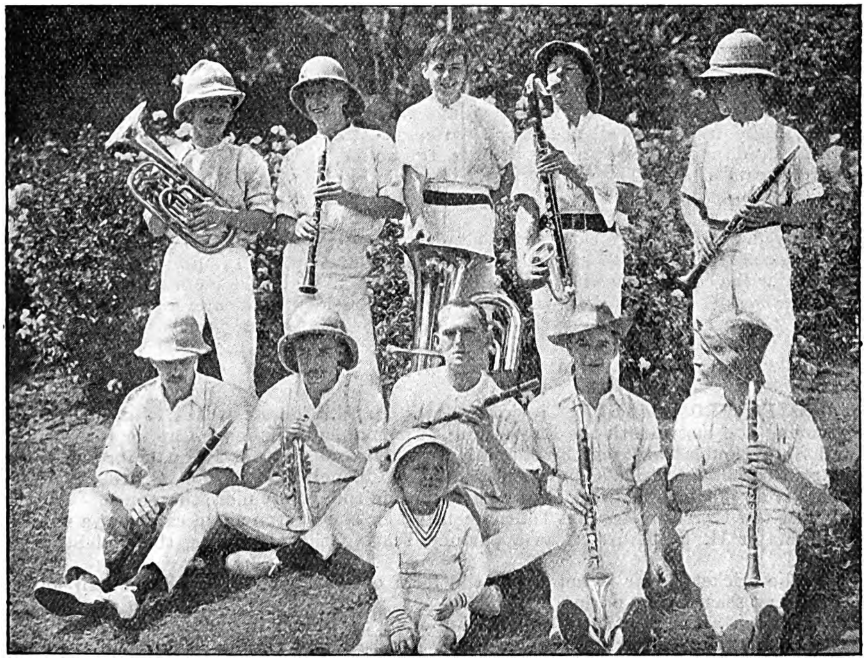
PICNIC AT THE NILE BARRAGE, MAY 12, 1913.

The Cocoa-nut Shies.

"The day still being young we passed several making their morning ablutions and offering up their prayers in the cool of the morning. Date palms bow gracefully to the morning breeze, and the scent of the limes and orange blossom is wafted into our carriage. Too soon, alas! all too soon, our train journey is at an end, and we jump out, to find ourselves the centre of a throng of gesticulating, evil-smelling, wondering natives. To unload the stores was the work of a moment, and hiring a couple of arabeahs to carry our food-stuffs, we went on our way to our final destination, about one mile distant. Passing over the stately bridge and under the quaint, picturesque turrets of the lockkeeper's quarters we entered the public gardens of the Nile Barrage. Passing along a broad avenue of cool and shady trees we turned sharply to the left and came upon a fairly open space in which were situated tables for the use of the public,

and we soon made ourselves at home. One pint of beer and cucumber sandwiches were now issued, and the band played a lively tune, after which we all joined in a game of 'rounders,' leaving the catering committee to get dinner ready. Very soon Sims and Ferdinando had the 'pot-a-biling' and within half an hour we heard the welcome news that the spuds were ready. Mattock and Edwards soon had the tables laid, and the troops came in response to the cook-house call sounded from the grotto. About half-past twelve we all sat down to a hearty dinner consisting of:—

Cold meat and salad, mashed potatoes.
Cucumber sandwiches.
Cold rabbit pie.
Pineapple chunks and custard.
Bananas and oranges.
Beer, lime-juice and lemonade.



The Musical Troupe.

"During the meal the bands of the Gordons and Suffolks alternately played selections from the principal comic operas; and to the accompaniment of such seductive melody, the beer and wines flowed freely, and pies and sandwiches disappeared with marvellous rapidity. Soon, however, Dame Nature demanded a rest, and at 2 p.m. dinner was over. We then turned our attention to the musicians, and although we could not entertain them with sweet melody we made up for it with cold rabbit pie and beer, which proved good substitutes. From 2 p.m. to 4 p.m. we had dancing on the village green (not forgetting the cocoa-nut shies). Having arranged a suitable spot, we drove stakes into the ground and stuck the cocoa-nuts on top, and for balls used bricks and stones. To the cry of 'Half-way for ladies! All bad nuts exchanged! All milky, gents!' the fun waxed fast and furious, and the cocoa-nuts came tumbling down in all directions. It was rather risky work sticking fresh ones on, as you had to take your chance of being mistaken for a cocoa-nut. After the shies little parties could be seen walking off with their cocoa-nuts under their arms to select a suitable spot to taste of their sweetness.

"At 4.30 p.m. our able and energetic committee had tea ready, and heads came popping out from every available bush and tree to the sound of the bugle and the cry of 'Tea up!

"Tea consisted of:—

Tea à l'Etat major.
Bread, butter and jam.
Fruits and assorted cakes.
Sandwiches.

"About 5.30 p.m. tea was over, and whilst the committee were packing up we took a stroll through the principal parts of the gardens. They are beautifully kept, and it reminded one of old England on a summer's day, only here the foliage is so different. Graceful palms dot the gardens and the swish of the bamboo is heard instead of the sighing of the oak and ash of England, beautiful birds flit to and fro, and flowers of almost every hue grow along the borders of the footpath. The 'Assembly' sounded all too soon and we all returned to our camp to help the committee fix the baggage for the return journey. At 6.30 p.m. we are once more in the train and singing is heard in every compartment. The train moves on and we take a last glimpse at the place where we had spent such a happy day. The moon is just rising, bathing the tips of the feathered palms in its beautiful soft white light; away across the river the little twinkling lights of the native village can be faintly seen, and as we pass along through the mysterious silence of the parting day, devoted heads are being bowed in prayer, and now and again one catches the sound of some far away voice raised in weird incantation. The train speeds on, the Barrage is past, softly we close the windows, shutting out from our gaze the entrancing vision of a moonlit scene in Egypt.

"By 8 p.m. we were back in the citadel and sitting down to the remains of our feast; soon tired heads began to droop, so we wound up our evening by giving three cheers for the committee who had taken such pains to make the picnic a success.

"*Names of the Committee.*—Corporal Bevan, President and caterer; Corporal Dewhurst, Corporal Reilly, Lance-Corporal Croker, Private Sims, Private Ferdinando, Private Edwards, Private Mattock.

"'Twas thus we spent Whitsun in Egypt."

NOTES FROM MALTA.—Serjeant-Major F. E. Collard writes, June 7, 1913: "During the last month the Lawn Tennis Tournament Challenge Cup for Regimental and Ship Doubles was won by Major Norrington and Captain Beaman for the third year in succession. The Cup was presented by Colonel Elliott Wood, C.R.E., in 1897. There is no previous instance of any pair winning the trophy more than once.

"In the Garrison Racquet Tournament Major Norrington again came out a winner with Major H. S. Thurston as a partner, beating the favourites, the 2nd Scottish Rifles.

"The cricket so far is not up to the form of previous years; the football doings of the past season were normal.

"Major C. R. Evans is training a team of six for rowing in a 28-ft. by 4-ft. gig.

"During the winter months the Corps has been put through an excellent course of training, one-third of the strength being exercised at a time. The instructor was Major Evans.

"The Company has also trained with the troops under various conditions, as well as practising embarking and disembarking from the warships.

"Lieutenant-Colonel T. G. Lavie has succeeded Colonel H. M. Sloggett as Officer Commanding 30th Company, and Officer-in-Charge, Military Hospital, Cottonera. Major Brogden has assumed charge of the Detachment and Hospital at Imtarfa. Major Brodribb relieved Major H. S. Thurston at Valetta Hospital. Major and Quartermaster H. S. Hasall relieved Captain and Quartermaster J. Green at the Medical Stores; Lieutenant and Quartermaster E. H. Newland is at Cottonera.

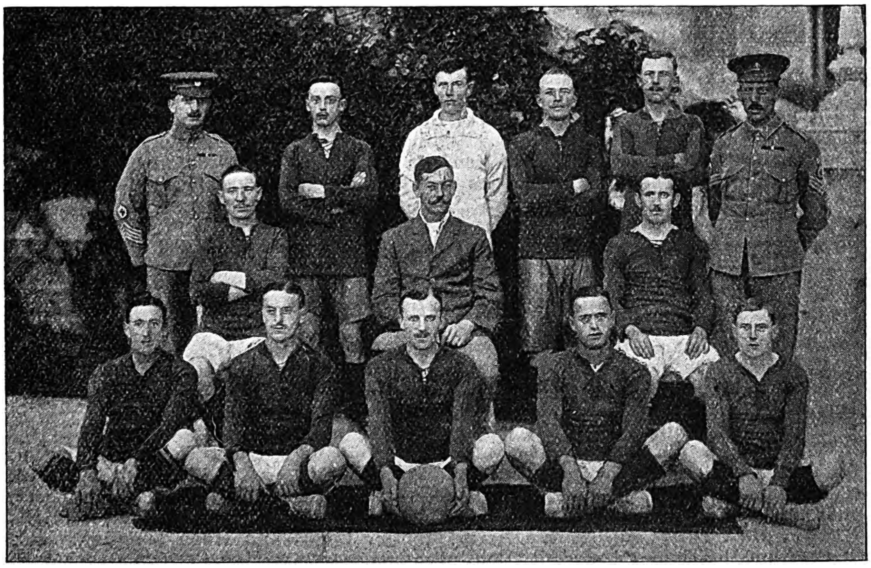
"Ghain Tuffieha Camp is now open, with Captain A. R. Wright in medical charge. A sanitary squad consisting of one serjeant and five men of the Corps is doing duty at this Camp. Serjeant-Major Storey proceeds on furlough on June 13 to England.

"The undermentioned embarked on H.M.S. 'The Black Prince' for special service in Scutari on June 7:—

"Major M. H. Babington and Lieutenant J. K. Gaunt. No. 8269 Quartermaster-Serjeant G. A. Gibbs, No. 18863 Serjeant J. Mulcahy, No. 19620 Lance-Corporal W. J. Carter, No. 19140 Lance-Corporal J. Price, No. 2083 Lance-Corporal

W. G. Pearce, No. 201 Private H. A. B. Besznak, No. 246 Private H. Burns, No. 2013 Private W. J. Connell, No. 4676 Private A. Hadfield, No. 4630 Private M. Howarth, No. 1865 Private R. Johnstone, No. 4470 Private A. King, No. 2009 Private H. Latimer, No. 1978 Private L. W. Moffet, No. 18247 Private J. Morrison, No. 2029 Private F. Robinson, and No. 1149 Private H. Boxall.

FOOTBALL TEAM.



Qmr.-Sjt. Gibbs (Secretary), Pte. Gardiner, Corpl. Staff, Pte. Russell, L.-Corpl. Carter, S.-Sjt. Lampard
Corpl. Hutchings (Captain), Sjt.-Major Collard, L.-Corpl. Taylor
Pte. Tipping, Pte. Johnstone, Corpl. Loweth, Pte. Howarth, Pte. Dugmore.

"Colonel R. Porter, D.D.M.S., has arranged for a series of lectures on Temperance to be given in the Command. This is warmly supported by His Excellency The Commander-in-Chief.

"Captain W. K. Beaman, R.A.M.C., has already lectured to the troops in the various barracks on 'Temperance from a Health Standpoint.'"

NOTES FROM SIMLA.—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director Medical Services (British Service), writes as follows, dated May 22, 1913:—

"*Appointments.*—Colonel W. W. Pike has been appointed to officiate for Surgeon-General T. M. Corker, in the 6th (Poona) Division.

"Lieutenant-Colonel H. Carr has been appointed to officiate as Assistant Director of Medical Services, Sirhind and Jullundur Brigades, with effect from May 14, 1913.

"*Leave.*—Surgeon-General T. M. Corker has been granted combined leave from April 15, 1913, to October 14, 1913.

"Colonel T. J. R. Lucas, has been granted combined leave from May, 1913, to July, 1913.

"Extensions and grants of general leave ex India to the undermentioned officers have been concurred in:—

"Major A. W. N. Bowen: Leave for 185 days, from June 14. 1913, extended to 195 days from that date, with permission to revert to the Home Establishment on the expiration thereof. Major F. P. Hewitt: Leave for six months from November 7, 1912, extended to November 6, 1913, on medical certificate. Captain G. P. A. Bracken: Leave for six months from January 30, 1913, extended to September 30, 1913, with permission to revert to the Home Establishment on expiration thereof. Captain

F. M. Hewson: Leave for six months from November 29, 1912, extended to August 5, 1913. Captain W. B. Rennie: Six months from May 30, 1913.

"*Exchange.*—An exchange for duty in India between the following officers has been effected:—

"Captain E. C. Whitehead to 8th (Lucknow) Division *vice* Captain M. P. Leahy, to Home Establishment.

"*Extension of Tour of Indian Service.*—The following officers have been allowed to extend their tour of Indian Service till trooping season 1914-15:—

"Brevet-Colonel R. S. F. Henderson, K.H.P.; Lieutenant-Colonels H. J. Fletcher, H. I. Pocock; Majors W. A. S. J. Graham, S. H. Withers, R. J. Blackham, V.H.S., E. V. Aylen; Captains D. T. McCarthy, F. T. Turner, D. F. Mackenzie, H. W. Farebrother, C. E. L. Harding.

"*Postings.*—The following changes in the postings of officers on their arrival in India have been made, at their own request: Lieutenant W. T. Graham, from the 3rd to the 8th Division; Lieutenant T. J. Hallinan, from the 8th to the 3rd Division; Lieutenant C. M. Finney, to the 3rd from the 2nd Division.

"*Specialists.*—The following officers have been appointed Specialists in the subjects and Divisions noted against them:—

"Major E. G. Ffrench, Dermatology, 9th (Secunderabad) Division.

"Lieutenant E. G. S. Cane, Prevention of Disease, and appointed to the Brigade Laboratory, Colaba."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants to be Captains: William H. L. McCarthy, M.D., dated May 17, 1913; John Inkster, M.B., dated May 24, 1913: Aston R. Dale, dated May 29, 1913; Ronald Mackinnon, M.B., dated June 7, 1913.

Lieutenant William S. Hyde is confirmed in his rank.

The undermentioned to be Lieutenants (on probation); Cadet Thomas McClurkin, from Belfast University Contingent, Officers Training Corps, dated April 30, 1913. Cadets Douglas Reid King and Gavin Young, from the Glasgow University Contingent, Officers Training Corps, dated May 1, 1913. Cadets Thomas Ingram Dun, from the Glasgow University Contingent, Officers Training Corps, and Hugh Kingsley Ward, M.B., from the Oxford University Contingent, Officers Training Corps, dated May 2, 1913. Cadet Lance-Corporal Henry Wingate Maltby, from the London University Contingent, Officers Training Corps, dated May 6, 1913. Cadet Lance-Corporal Maurice Paterson Inglis, from the Edinburgh University Contingent, Officers Training Corps, dated May 12, 1913. Cadet Allan Dumbreck Fraser, from the Glasgow University Contingent, Officers Training Corps, dated May 14, 1913. Basil William Brown, M.B., dated May 17, 1913. Cadet Serjeant Thomas James Kelly, from the Dublin University Contingent, Officers Training Corps, dated May 26, 1913. Cadet Serjeant Kenneth Alexander Macdonald Tomory, from the Edinburgh University Contingent, Officers Training Corps; Cadet Corporal John Taylor, from the St. Andrew's University, Officers Training Corps; Henry Paterson Crow, late Cadet, Glasgow University, Officers Training Corps; and David Mackie, late Cadet, Glasgow University Contingent, Officers Training Corps, dated May 27, 1913. Henry Holmes Mulholland, M.B., late Cadet, Belfast University Contingent, Officers Training Corps, dated May 29, 1913. James Jackson Finlay, late Cadet, Glasgow University Contingent, Officers Training Corps, dated June 4, 1913.

TERRITORIAL FORCE.

Army Medical Service.

The King has been graciously pleased to appoint Colonel William Henry Bull, F.R.C.S. (Edin.), Army Medical Service, Assistant Director of Medical Services of the South Midland Territorial Division, and Colonel John Arnallt Jones, M.D., Army Medical Services of the Welsh Territorial Division, to be Honorary Surgeons to His Majesty.

The King has been graciously pleased to appoint Colonel William Kinnear, M.D., Army Medical Service, Assistant Director of Medical Services of the Highland Territorial Division, and Colonel Charles Pye Oliver, M.D., Army Medical Service, Assistant Director of Medical Services of the Home Counties Territorial Division, to be Honorary Physicians to His Majesty.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned Officers of the Territorial Force, who have been duly recommended for the same under the terms of the Royal Warrant dated August 17, 1908:—

Yorkshire Dragoons (Queen's Own) Yeomanry.—Surgeon-Major Percy Bernard Mackay.

ROYAL ARMY MEDICAL CORPS.

London Mounted Brigade, Field Ambulance.—Major Martin Alfred Cooke. Major Christopher Vise, M.D., attached to the 4th Battalion, The Queen's Own (Royal West Kent Regiment). Major Stephen Nesfield, attached to the 8th (Ardwick) Battalion, The Manchester Regiment. Major John Barr Stevens, M.B., attached to the 6th (Renfrewshire) Battalion, Princess Louise's (Argyll and Sutherland Highlanders).

The King has been graciously pleased to confer the Volunteer Officers Decoration upon the undermentioned Officer of the late Volunteer Force, who has been duly recommended for the same under the terms of the Royal Warrant, dated July 25, 1892:—

1st Cadet Battalion, The King's Royal Rifle Corps.—Surgeon Lieutenant-Colonel St. John Frank Blake-Campbell.

INFANTRY.

6th *Battalion, The South Staffordshire Regiment.*—Surgeon-Captain Frederick Edge, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 4, 1913.

ROYAL ARMY MEDICAL CORPS.

Highland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—George Glendinning Middleton, M.B., to be Lieutenant, dated April 1, 1913.

South Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant Frederick B. Treves M.B., to be Captain, dated December 8, 1911.

1st East Anglian Field Ambulance, Royal Army Medical Corps.—Captain Ernest V. Gostling to be Major, dated March 13, 1913.

2nd East Anglian Field Ambulance, Royal Army Medical Corps.—Thomas Aloysius Flynn to be Lieutenant, dated May 5, 1913.

3rd Home Counties Field Ambulance, Royal Army Medical Corps.—Alexander Hampton Brewer to be Lieutenant, dated May 2, 1913.

1st East Lancashire Field Ambulance, Royal Army Medical Corps.—John Crighton Bramwell (late Cadet Staff Serjeant, Cambridge University Contingent, Senior Division, Officers Training Corps), to be Quartermaster, with the honorary rank of Lieutenant, dated April 10, 1913.

1st Wessex Field Ambulance, Royal Army Medical Corps.—Frank Arthur Roper, M.B., to be Lieutenant, dated April 22, 1913.

1st Southern General Hospital, Royal Army Medical Corps.—Captain Walter J. Clarke resigns his commission, dated June 4, 1913.

3rd Home Counties Field Ambulance, Royal Army Medical Corps.—Lieutenant Hector G. G. Mackenzie, M.B., to be Captain, dated April 20, 1912.

5th London Field Ambulance, Royal Army Medical Corps.—Supernumerary Lieutenant Frank Coleman is absorbed into the establishment, dated May 4, 1913.

1st Southern General Hospital, Royal Army Medical Corps.—Seymour Gilbert Barling (late Major, 2nd South Midland Field Ambulance, Royal Army Medical Corps), to be Major, whose services will be available on mobilization, dated May 9, 1913.

North Midland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Thomas George Buchanan, M.B., to be Lieutenant, dated April 28, 1913.

4th London Field Ambulance, Royal Army Medical Corps.—Captain Arthur E. Jerman to be Major, dated June 18, 1913.

2nd West Riding Field Ambulance, Royal Army Medical Corps.—Lieutenant Francis G. Dobson, M.B., to be Captain, dated May 13, 1913.

3rd East Lancashire Field Ambulance, Royal Army Medical Corps.—William James Reid, M.B., to be Lieutenant, dated April 1, 1913.

1st London (City of London), Field Ambulance, Royal Army Medical Corps.—Lieutenant Hans C. Swertz, M.B., resigns his commission, dated June 21, 1913.

3rd London (City of London) Field Ambulance, Royal Army Medical Corps.—Lieutenant Robert Eric Barnsley, from the 2nd London (City of London) Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated March 13, 1913.

6th London Field Ambulance, Royal Army Medical Corps.—Philip Seymour Price to be Lieutenant, dated June 2, 1913.

2nd Welsh Field Ambulance, Royal Army Medical Corps.—Lieutenant Owen L. Rhys, M.D., to be Captain, dated March 25, 1913.

2nd London Sanitary Company, Royal Army Medical Corps.—Captain John Muir. M.B., resigns his commission, dated June 21, 1913.

Officers attached to other Units.

Lieutenant Cecil Johnson, M.B., to be Captain, dated December 4, 1912.
James Henry Crane, M.D., to be Lieutenant, dated January 22, 1913.
Ernest Stanley Stork, M.B., to be Lieutenant, dated April 23, 1913.
Major James Stratton Warrack, M.D., from the 1st Home Counties Field Ambulance, Royal Army Medical Corps, to be Major, dated June 4, 1913.
Lieutenant Joseph D. Wells, M.B., to be Captain, dated February 11, 1913.
Lieutenant Harry B. Sproat, M.D., to be Captain, dated July 27, 1912.
Captain John Bradford resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated June 14, 1913.

The undermentioned officers resign their commissions, dated June 18, 1913:—
Lieutenant-Colonel William Mearns, M.D., who is granted permission to retain his rank and to wear the prescribed uniform.
Lieutenant Henry W. M. Strover, M.B.
Lieutenant Allan D. Low.
James Leslie Wilson, M.B., to be Lieutenant, dated May 5, 1913.
William Emerson Lee, M.D., to be Lieutenant, dated June 18, 1913.
Lieutenant Dudley W. C. Jones, M.D., to be Captain, dated April 26, 1913.
Lieutenant Joseph H. Donnell, M.B., to be Captain, dated May 5, 1913.

The undermentioned officers resign their commissions, dated June 21, 1913:—
Lieutenant-Colonel and Honorary Surgeon-Colonel Edward Williams, who is granted permission to retain his rank and to wear the prescribed uniform.
Captain Henry Robinson, M.D.
Lieutenant James T. R. MacGill, M.B.
Lieutenant Donald G. MacGill.
William John Herbert Davis to be Lieutenant, dated May 2, 1913.

Officers Training Corps.

Royal College of Surgeons in Ireland Contingent, Senior Division, Officers Training Corps.—Lieutenant John Campbell, Royal Army Medical Corps, Special Reserve, ceases to serve with the Contingent, dated June 11, 1913.

Supernumerary for Service with the Officers Training Corps.

Gerald Graham Alderson (late Private, Inns of Court, Officers Training Corps) to be Lieutenant, for service with the medical unit of the University of London Contingent, Senior Division, Officers Training Corps, dated May 8, 1913.
Lieutenant Harold Kinder Griffith, from the 9th (County of London) Battalion, The London Regiment (Queen Victoria's Rifles), to be Lieutenant, for service with the medical unit of the University of London Contingent, Senior Division, Officers Training Corps, dated May 8, 1913.

UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Captain Ernest Knight, M.B., from the 3rd West Lancashire Field Ambulance, Royal Army Medical Corps, to be Captain, dated May 7, 1913.

VOLUNTEER FORCE.

Cadet Battalions.

1st Cadet Battalion, The King's Royal Rifle Corps.—Surgeon-Captain Redmond Roche to be Surgeon-Major, dated April 25, 1912.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Matron: Miss B. I. Jones, to Chatham, on return from Egypt. Staff Nurses: Miss E. V. Forrest, to London, from York; Miss I. J. Taunton, to Dublin, from London; Miss C. M. Pearce, to York, from Cosham; Miss C. M. Hodson, to Gibraltar, from Hounslow; Miss M. McCormick, to Hounslow, from London; Miss I. Carruthers, to Cosham, on provisional appointment.
Appointment Confirmed.—Staff-Nurse: Miss M. Williams.

ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

The Annual General Meeting of this Society was held at the Royal Army Medical College on May 27, the Director-General, President of the Society, in the chair.

The Report and Statement of Accounts for the year 1912 (which were published in the May issue of the Journal of the Royal Army Medical Corps) were adopted.

Surgeon-General Sir Charles Cuffe, K.C.B., Colonel Sir William Leishman, F.R.S., and Major C. E. Pollock, retiring at the expiration of their term of three years, were re-elected members of the Committee.

Lieutenant-Colonel S. Guise Moores was elected a member in the place of Colonel Wardrop, C.V.O., who retires.

Messrs. Deloitte, Plender, Griffiths, and Company were appointed Auditors for the year 1913.

J. T. Clapham,
Captain,
Secretary.

20, *Belgrave Road, S.W.*

UNITED SERVICES MEDICAL SOCIETY.

At the Annual General Meeting of the Society, held at the Royal Army Medical College on June 11, the President, Fleet-Surgeon Bassett-Smith, C.B., R.N., in the chair:—

(1) It was proposed and carried unanimously that the following officers should be elected in place of those about to retire.

President—Colonel Bruce Skinner, M.V.O.

Hon. Secretaries—Staff-Surgeon Adrian Forrester, R.N.; Captain G. A. D. Harvey, R.A.M.C.

Hon. Treasurer—Major F. S. Irvine, R.A.M.C.

(2) It was proposed and carried that (*a*) in succession to Sir Havelock Charles, G.C.V.O., and Major F. S. Irvine, who become *ex-officio* Members of Council, the following be elected Members of Council:—

Sir Ronald Ross, K.C.B., F.R.S.; Major Howard Ensor, D.S.O.

And (*b*) that, in succession to the four Members of Council retiring in rotation, the following be elected Members of Council:—

Surgeon-General Sir Arthur Branfoot, K.C.S.I., I.M.S.; Colonel J. Harper (T.F.); Fleet-Surgeon P. M. Bassett-Smith, C.B., R.N.; Lieutenant-Colonel W. W. O. Beveridge, D.S.O., R.A.M.C.

(3) It was proposed by Colonel Bruce Skinner, M.V.O., and seconded by Major S. L. Cummins, that, in recognition of his being the Founder of the Society, Surgeon-General Sir Alfred Keogh, K.C.B., be made a special Member of the Society.

This was carried unanimously.

(4) It was proposed by Major F. S. Irvine, and seconded by Major W. S. Harrison, that the day of the monthly meetings of the Society be altered from the second Wednesday to the second Thursday in the month during the coming Session.

This was carried unanimously.

(5) It was proposed by Major S. L. Cummims and seconded by Major W. S. Harrison that the following additions be made to the Rules: To Rule III, Para. 10: "That each duly constituted Branch of the Society shall elect, biennially, one Member of Council."

To Rule V, para. 1, "and at the Royal Naval Medical College, Greenwich."

This was carried unanimously.

The President having called upon the Hon. Secretary for his report, Major S. L. Cummins reported that the Meetings of the Society had been well attended, that an average of five speakers had taken part in the discussions, and that the Session as a whole had been a successful one. A Branch of the Society had been formed at Portsmouth with Colonel Westcott, C.M.G., as President and Staff-Surgeon T. B. Shaw, R.N., as Hon. Secretary, and the Branch appeared to be a success in every way. It had been arranged that officers joining the Branch should pay their subscriptions to the Parent Society, the latter bearing the expense of the teas at the Portsmouth meetings and of the publication of the papers read at

the Branch meetings in the *Transactions*. This arrangement led to expenses which about tallied with the amount received in extra subscriptions. The Council had decided to attempt to extend the area of the Society by encouraging the formation of branch societies wherever possible and, to this end, letters had been written to the Director-Generals of Colonial Army Medical Services inviting them to co-operate by bringing about a closer connexion between the Society and any similar local Societies that may already exist or by the formation of Branches if thought desirable. The Officers of Colonial Army Medical Services had been cordially invited to become members of the Parent Society and, whether members or not, to attend the meetings of the Society if in London during the session. The Council had also taken advantage of their powers under the rules and had invited the Director-Generals of the Army and Navy Medical Services of the following Powers to become Associate Members of the Society: France, Germany, Austria, Russia, America and Japan. In addition, the Council, desiring to signalize their admiration of the services to health of Colonel Gorgas, U.S.A., in the Panama zone, had invited this Officer to become an Associate Member. As during the previous session so during the current one the Society had adhered to its policy of selecting subjects of executive rather than strictly medical interest for discussion and the success of this policy was evident in the good attendance at the meetings. It was felt that the number of Medical Societies already existing in London sufficiently catered for those officers who desired to participate in meetings dealing with professional subjects, but no other Society existed where officers could unofficially exchange opinions on the important subject of the executive duties of the Medical Services in War. While this policy was natural and advantageous for the Parent Society, owing to its situation in London, it neither ought to apply nor did apply to the Branch Societies at Malta and Portsmouth, where the meetings encouraged the discussion of cases and the reading of papers on scientific, equally with technical subjects. The Society owed much to the interest and co-operation of the officers of the Territorial Medical Service, which had added greatly to the interest of the meetings during the Session.

The President then called on the Hon. Treasurer, Major W. S. Harrison, for his Report. Major Harrison presented the balance sheet of the Society, duly audited, and showed that, although the printing of the *Transactions* had been more expensive than formerly, there had been, on the whole, an increase in the funds at the disposal of the Society, and that the membership was steadily increasing.

The President pointed out that a new departure had been made during the Session in the holding of two meetings at the Royal Naval Medical College at Greenwich and hoped that this precedent would be followed in the future. While stationed at Greenwich, he would always be delighted to help as far as possible in this matter. He desired to express his gratitude to the secretaries for their kind help during the session, and congratulated the Society on its new President, under whom it was sure to go forward to fresh successes.

Major F. S. Irvine proposed and Major C. E. Pollock seconded a vote of thanks to the retiring President, Fleet-Surgeon Bassett-Smith, for his valuable services to the Society, which was carried unanimously.

REPORT OF THE ANNUAL MEETING OF THE ROYAL ARMY MEDICAL CORPS FUND.

The eleventh annual meeting of the Royal Army Medical Corps Fund was held at the Royal Army Medical College, on Monday, June 16, 1913, when there was an exceptionally large attendance. The Director-General Army Medical Service (Sir Launcelotte Gubbins) presided.

The Chairman, in opening the proceedings of the meeting, said that he would call upon the Secretary, Lieutenant-Colonel Davie Harris, to read the report for last year.

Report presented at the Eleventh Annual General Meeting, June 16, 1913.

The committee as you know undertakes, with the assistance of sub-committees, the management and administration of the various funds, viz.: The Corps Fund, the General Relief Fund and the Compassionate School Fund.

The Corps Fund as primarily formed comprised the dinner, band and memorials. As its revenue now exceeds its expenditure, and as most of the memorials are now completed, and further, as there is now a large surplus invested, the question arises whether some of the surplus revenue might not be expended in other channels for the benefit of officers of the Corps. There are several precedents for this course. For the last three or four years it has been the custom for this meeting to vote a grant from the Corps Fund to the General Relief Fund, thus making each officer of the Corps who is a subscriber to the Corps Fund also a subscriber to the General Relief Fund. Again in 1908 a grant was given by the Annual General Meeting to the College in aid of its expenses in entertaining distinguished guests. Last year again at the annual meeting a resolution was passed giving power to the committee to make small special grants, not exceeding £10, to very special cases of distress. No occasion has arisen during the year for the committee to exercise this authority. In view of the following resolution, it is questionable whether it is needful to ask you to extend or continue that authority.

In accordance with a resolution passed by the Annual General Meeting in 1907, a special meeting was held on July 12 of that year, consisting of seven members of the committee of the Royal Army Medical Corps Fund, and seven subscribers nominated by the general meeting of that year, to determine the amount and disbursements of the subscriptions, and giving power to the committee to act on the resolutions passed by this meeting. One resolution passed was "That the money subscribed to the Corps Fund shall be administered by the committee as in their judgment may seem best." This and other resolutions were mentioned by the Chairman in his speech the following year, and so practically confirmed, thereby giving your committee a free hand in all expenditure.

Committee.—During the past year the following changes have been made on the committee: Colonels Lynden-Bell and Skinner have succeeded Colonels Bedford and Risk, Major Fell has taken the place of Major Birrell, Captain Wright has taken the place of Major Delap, and Lieutenant-Colonel Pope and Colonel Sir James Clark have been elected in the places of Lieutenant-Colonels E. O. Wight and James, as representing retired officers.

Finance.—The accounts of the fund are made up to December 31, of each year, and after being duly audited and passed by the Committee are published in Corps News of the February issue of the Corps Journal.

The Finances of the fund on June 1, were approximately as follows: Royal Army Medical Corps current account, £561; deposit account, £800; investments, £2,046. General Relief Fund, current account, £421; deposit account, £400; investments, £1,094. School Fund, current account, £58; deposit account, £400. Making a total of £5,780, which is an increase of £280 on last year.

From the accounts for 1913 it may be noted that the Corps Fund had £2,200 on deposit which brought in a fixed rate of interest of 2½ per cent., or £55 a year. The committee at their meeting last January decided to invest £2,000 of this money in the names *ex officio* of the Director-General, the Deputy Director Medical Services, London district, and the Commandant of the College. They therefore purchased £1,011 No. 1 preference stock 4 per cent. Caledonian Railway at 97¾ and £1,035 North British Railway 4 per cent. preference stock at 95¾.

We therefore now hold preference stock 4 per cent. in these two investments to the amount of £2,046, which cost the fund, including brokerage, stamps, &c., £1,999 12s. and will produce an income of £80 per annum, instead of £55 which we were previously getting.

Subscribers.—The number of subscribers for 1912 was 1,100, an increase of 22 on last year. There are several officers on the active list still who do not subscribe, and some officers on going abroad or becoming seconded, stop their subscriptions, apparently losing sight of the fact that whether they are at home or abroad, the fund still maintains their share of credit for the band, dinner, memorials, &c.

Band.—During the past year £432 was voted by the committee from the fund towards the expenses and upkeep of the band, as against £375 the previous year. The committee do not wish to make any hard and fast limit to the contribution, but they endeavour, as far as they are able, to keep the grants to about £400 a year.

Dinner.—£269 was paid from the fund towards the expenses of last year's dinner. Colonel Lynden-Bell has succeeded Colonel Bedford as President of the Dinner Sub-Committee. The report and accounts for 1912 were published in the Corps News for May.

It will be noted that the Dinner Sub-Committee proposed that the price of the

dinner tickets should be reduced this year to 5s., but the Committee, after full consideration, found that they could not concur in this recommendation.

Memorials.—Colonel Skinner and Lieutenant-Colonel Pope have replaced Colonel Risk and Lieutenant-Colonel Wight on the Memorial Sub-Committee. During the year the Committee decided to pay out of the Corps Fund the annual premiums for fire insurance of the buildings, windows, memorials and fabric of the Chapel of Queen Alexandra's Military Hospital; portraits have been painted of your present Director-General and Assistant Surgeon McMasters, V.C.; £21 was subscribed to the Memorial Fund of Miss Florence Nightingale; the Committee also paid £18 17s. 2d. towards the expenses of the publication of "Service Memories" by Sir Anthony Home.

General Relief Fund.—During the year 1912, £242 10s. 10d. was received from Companies as compared with £234 16s. 4d. the previous year; £212 was expended in grants; £51 was given in subscriptions to institutions and societies for the benefit of N.C.O's. and men past and present of the Corps as follows:—

(1) Corps of Commissionaires, £10. Ninety-three men of the R.A.M.C. were employed during the past year, of whom ninety were found permanent employment.

(2) Soldiers' and Sailors' Help Society, £5. Found employment for twenty men, of whom five were N.C.O's.

(3) National Association for the Employment of Reserve and Discharged Soldiers, £7 2s. Found employment for 371 of our men.

(4) Union Jack Club, £25 4s.

Schools.—This is a decreasing fund at the rate of about £100 a year. We contribute towards the maintenance of three children in the Homes for Destitute Catholic Children, one child in the Drummond Institute, and we have seven children in the Royal Soldiers' Daughters' Home, one of whom is in free, and for another the father pays half; the other five are paid for by the Fund.

GENERAL RELIEF FUND.

Grants Received during the Year 1912.

Company.		£	s.	d.
	Aldershot	60	0	0
	Netley	5	0	0
6	Portsmouth	5	0	0
7	Devonport	Nil.		
8	York	2	10	0
9	Colchester	5	0	0
10	Chatham	1	10	0
11	Dover	8	8	0
12	Woolwich	10	0	0
13	Edinburgh	5	0	0
14	Dublin	7	10	0
15	Belfast	3	17	0
16	Cork	5	0	0
17	Curragh	8	4	3
18	London	2	0	0
19	Chester	3	4	0
20	Tidworth	21	0	0
22	Cape Town	Nil.		
23	Pretoria	10	0	0
24	Bloemfontein	20	0	0
25	Bermuda	2	2	0
26	Ceylon	5	0	0
27	Hong Kong (Serjeants' Mess, £2)	4	0	0
28	Gibraltar	3	0	0
29	Jamaica	1	8	0
30	Malta	10	0	0
31	Mauritius	2	0	0
32	Singapore (Officers)	4	7	0
33	Egypt	6	0	0
35	London	5	0	0
	Tidworth Camp of Instruction	14	10	3
	,, ,, ,, (Serjeants' Mess)	2	0	4
		£242	10	10

The Chairman: Now, gentlemen, has anybody any remarks to make?

Lieutenant-Colonel E. M. Wilson: I should like to say that I think the resolution Colonel Harris refers to, as passed in 1907, by which it was agreed that it should be left to the Committee to allot the money as seemed to them most advisable, applied only to the memorials, band, or dinner, and in such a way as might be decided upon, and not to other objects outside these three.

The Chairman then asked Lieutenant-Colonel Harris to read the proceedings of that meeting.

Lieutenant-Colonel Harris then read the minutes of the meeting held in 1907.

Lieutenant-Colonel Wilson: I thought from the report that the 1907 resolution was considered by the Committee to give power to grant money for purposes other than the memorials, band, and dinner, but apparently it does not do so.

Lieutenant-Colonel Harris: The report says it is questionable, but if it does not give power, we shall have to ask this general meeting to give us power to renew special grants; but if it does go outside, then there is no need.

The Chairman: Has anybody else any remarks?

Lieutenant-Colonel Wilson: It seems to me to be advisable that the Committee should have power to give grants to those in distress. I will therefore propose at once that the general meeting empower the Committee to give, in cases of emergency, grants not exceeding £100 total in any one year, to widows and orphans.

The Chairman: Will anybody second that resolution?

Surgeon-General Donovan: I will second it.

The Chairman: Well, gentlemen, I will put this resolution to the meeting. It is proposed by Lieutenant-Colonel Wilson and seconded by Surgeon-General Donovan that the Committee be accorded power to give, in special cases of distress, grants not exceeding £100 total in one year, to officers and their dependents.

Carried unanimously.

The Chairman: Now we come to item No. 2—to vote a grant for the General Relief Fund. Has anybody any proposals to put forward regarding this question?

Lieutenant-Colonel Wilson: I suggest that the amount be raised to £80. The total expenditure from the General Relief Fund amounts to £386. The School Fund is diminishing, and though it will be sufficient to educate the present children until they finish, it will not provide for the education of any more, so the schooling must be taken over by the General Relief Fund, and as the School Fund is decreasing, I propose that the grant be increased from £60 to £80.

Colonel Murray: I will second that.

The Chairman: It has been proposed by Lieutenant-Colonel Wilson, and seconded by Colonel Murray that the grant to the General Relief Fund be increased to £80. Carried unanimously.

The Chairman: We now come to the question of the price of dinner tickets, and we should like to have your views on this subject.

A considerable amount of discussion took place on the subject, and eventually it was proposed by Lieutenant-Colonel Thompson and seconded by Colonel Peterkin that the price of the dinner tickets should remain as at present, viz., 7s. 6d. This was put to the meeting and carried.

The Chairman: We now come to item No. 4—to consider a recommendation of the Committee that a donation of £25 for the current year and an annual subscription of £25, commencing with 1913, be given to the Royal School for Officers' Daughters, Bath. I may state, as possibly you know, this School is for orphan daughters of Army officers. The Trustees of the School are Lord Roberts, Sir William Taylor, and Mr. Mullens. The School is in rather low water at present, and special efforts are being made to raise money for next, which is the Jubilee, year; they are trying to collect £3,000 to build a central hall, which is very much needed. Last month £600 was raised at a special dinner held at the Savoy Hotel. I am sorry to say that the medical officers do not subscribe as liberally as they might, although there are seventeen daughters of medical officers in the School. This matter was brought to my notice by Sir William Taylor and I can only add that being on the Committee of the School I visited it last year, and found it thoroughly well organized; the teaching is excellent, the situation is ideal, and I can highly commend it to you as deserving of every support.

Colonel Hackett: I should like to see more medical officers support the School, and as we get two votes for every guinea subscribed, I propose that we subscribe 25 guineas, thus securing fifty votes for each election.

The Chairman: Has anybody else any remarks to make on the subject?

Surgeon-General Babtie and others having spoken in support of the proposal, the Chairman called on those in favour of £25 as a special donation to the central hall for the current year, to show their hands. This was carried unanimously.

The Chairman: Well, gentlemen, I would like to hear any further remarks before I put the second part of the resolution about an *annual* subscription.

As there was no further discussion the resolution was put to the meeting that "an annual subscription of 25 guineas, commencing in 1913, be given to the Royal School for Officers' Daughters, Bath," and was carried unanimously.

Sir William Taylor, one of the Trustees, had intended being present to support the proposals, but was unavoidably detained at the last moment.

This completed the business of the meeting.

ROYAL ARMY MEDICAL CORPS CENTRAL MESS FUND AND GAMES COMMITTEE.

The annual general meeting of members of the above was held on June 16, at the Royal Army Medical College. Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, in the chair.

The Chairman having asked the Honorary Secretary, Captain J. T. Clapham, to make a statement as to the progress of the fund, the latter said that it might be well to draw attention to one or two points, in addition to those mentioned in the report of the fund which had been published in the June number of the Corps Journal, and printed copies of which were in the hands of those present. He had received many letters from stations all over the world, and gathered that there was a general feeling that new messes should not be opened, at home or abroad, unless it were absolutely certain that the membership of such would be sufficient to ensure their being permanently self-supporting. Several officers at Pretoria expressed the opinion that help should be given from the fund to the headquarters mess in London, especially with a view to reducing the expenses of junior officers stationed there. Another opinion from South Africa was that if any mess were closed permanently it should hand over any balance to the central fund, for the benefit of other messes. This had taken practical shape in the action of the committee of the recently closed mess at Tempe, who have asked the Commandant of the College to take charge of their cash balance, and some plate, for the benefit of any new mess which may be opened, preference to be given to any in South Africa. In India a very large majority were in favour of the fund. Rawal Pindi were willing to support it, though they thought that their heavy expenditure on debenture charges should be borne in mind. Ambala and Lucknow thought that the fund should be available to help in maintaining the headquarters mess in London, and in entertaining such guests as distinguished foreigners, who, they considered, would naturally be guests of the whole Corps. The Hon. Secretary had heard that much of the property of the Peshawar mess had recently been stolen but would make further inquiries. From Tidworth, Cosham, Sierra Leone, and elsewhere, a wish had been expressed that subscribers to the central fund should be exempt from the joining contributions which they now pay to almost all messes. The committee consider that this is an object which should not be forgotten, but it can hardly be considered apart from the general question of such contributions from the time of an officer entering the Corps. Details which have been obtained from all messes, at home and abroad, show that the refund of a sum equal to the total of the joining contributions now paid would absorb four-sevenths of the gross income of the fund, even on the supposition that the latter were supported by all officers of the Corps. Various stations at home and abroad, notably Colchester, thought that there should be representatives on the committee of stations other than those where there were messes. Thanks to assistance from the fund, as well as to liberal help in personnel and kit from Aldershot, it was understood that the mess at Longmoor Camp was being run at very much less than contract rates. The conditions at Tidworth and the Curragh differed very much, but it was hoped that some satis-

factory means of helping them might be found, especially in the case of the Curragh, as every officer in the Irish Command had supported the fund.

Before dealing with the proposals of the Committee, the Chairman invited remarks.

Colonel Skinner, *à propos* of the Tempe mess, said he had only that morning heard that they had accepted his suggestion to hand over their cash balance to the Central Fund for the purposes above stated. He added that he hoped inquiries would be made as to the loss at Peshawar.

The Chairman explained that the distribution of the Special Mess Fund, the balance of which, some £80, he had handed over to the Central Mess Fund, was left in the hands of the Director-General. Before he assumed his present office a Special Mess Fund, amounting to about £500, had been transferred from Netley to London, when the latter became the headquarters mess of the Corps. Of this, £250 had been allotted, in 1909, to the London mess; £100 to Netley; and the remainder, other than the above balance, to Cairo, Cosham, Chatham, and Bloemfontein.

Referring to the International Congress of Medicine to be held in London next August, the Chairman said that it had been suggested that the Central Mess Fund be asked to contribute to the cost of the entertainments which would be given by the Corps on that occasion. It was intended to have a conversazione for seven or eight hundred guests at the mess on August 7, and on the 11th it was expected that fifty delegates would dine there. He thought that he was expressing the view of the subscribing members of the London mess, about fifty in number,[1] when he said that they wished to bear the whole of the expense of these entertainments themselves, and would not call on the Central Mess Fund for anything whatever; they felt proud to uphold the honour of the Corps.

The Chairman then put the following recommendations of the Committee as resolutions:—

(1) "That members of the Central Mess Fund and Games Committee be in future elected as representatives of districts at home, and not of messes as heretofore. That of such areas the Aldershot Command and London District each appoint two representatives."

This was adopted unanimously.

(2) "That established messes abroad receive equal consideration in every way with those at home. That for this purpose it is advisable that there be foreign as well as home representatives on the Committee. Such might be either officers on leave, or those who have not been on the home establishment for more than a certain period."

On the question of the increase of messes in India, the Chairman said that Sir Francis Trevor would agree with him that it would probably not be necessary to open any more in that country, where we already had four or five. It was his policy, and he thought it had been that of Sir Francis, to encourage our young officers to mix with those of other branches of the Service in regimental messes, which he considered was to their advantage. With regard to messes at home he did not think it probable that they would be increased in number; as it is, there is often great difficulty in finding sufficient bachelor officers. It had been suggested that each established mess abroad should have one representative on the Committee. Resolution 2 was then put, and carried *nem. con.*

(3) "That a refund of the annual contributions to the Central Fund of all officers who are subscribing members of permanently established messes at home and abroad on April 1 of each year, from 1914 onward, shall be made to the messes of which such officers are subscribing members: the question of repayment to individuals or appropriation of the refund to the Mess Fund being left to the decision of the messes concerned."

Lieutenant-Colonel Maher thought that such refund might be set aside by the various messes for the purposes of entertainment.

Lieutenant-Colonel H. N. Thompson thought that there was no object in taking money with one hand and refunding it with the other.

On the motion of Lieutenant-Colonel H. N. Thompson, seconded by Colonel Skinner, Resolution 3 was unanimously rejected.

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[1] On June 4, 1913, the subscribing members of the Royal Army Medical Corps Mess were composed of the following: War Office, 8; London District, 18; Queen Alexandra Military Hospital, 12; Royal Army Medical College, 12; Eastern Command, 4; total, 54.

(4) "That the accounts of the Central Mess Fund be audited annually and published in the Corps Journal; the auditors to be appointed by the Annual General Meeting."

This resolution was adopted unanimously, and it was resolved that Mr. Gann, of the War Office, be asked to act as auditor.

(5) "That messes which do not make all officers of the Corps on the active list honorary members be invited to extend this privilege to those who are subscribers to this Fund."

This resolution was rejected *nem. con.*

(6) "That officers on the retired and half pay lists be eligible to subscribe to the Fund, and that their annual subscription be at the rate of one half of one day's retired, or half pay, of their rank. That messes be invited to accord the above privilege to such subscribers also."

Resolution 6 was adopted *nem. com.* with the amendment, proposed by Lieutenant-Colonel Hunter, seconded by Colonel Skinner, that for the last sentence therein be substituted, "That established messes be invited to accord the privilege of honorary membership to such subscribers."

The question of the abolition or reduction of contributions on joining messes was then discussed, and Surgeon-General Babtie proposed:—

"That the principle be affirmed of relieving subscribers to the Central Fund of their entrance fees to messes, or of diminishing them; the amount to be left to the Committee."

This was seconded by Major Irvine.

Surgeon-General Babtie pointed out that many officers have to join three or four messes in as many years, and that it would be a great boon if some relief could be given in this way.

Major Moore thought that many difficulties would arise if the refund of entrance fees were adopted too hurriedly, and that the data available showed that in its present condition the Central Fund would not be able to meet this charge.

On this resolution being put to the vote it was rejected by 22 votes to 13.

The following resolution was then put from the Chair:—

"That the Committee be instructed to go into the whole question of the abolition or reduction of entrance fees, and to report to the next annual general meeting."

Carried *nem. com.*

Passing to the subject of games, the Chairman said that he thought our recent successes, of which the list in the report did not pretend to be a full record, were very satisfactory.

Surgeon-General Babtie hoped that every effort would be made to enable the Corps to be represented in the various inter-regimental contests, and that it would not be long before we were able to meet other branches of the Service with a Corps team, in other than individual competitions.

The meeting closed with a vote of thanks to the Chairman.

ROYAL ARMY MEDICAL CORPS ANNUAL DINNER, 1913.

The Annual Dinner was held at the "Empire and Alexandra Rooms," Trocadero Restaurant, on Monday, June 16, at 8 p.m., the Director-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., being in the chair. The number of officers, past and present, of the Corps attending the dinner wac 217. Mr. Vesey Holt was present as a guest.

The following is a list of the officers present:—

Surgeon-Generals. — Sir W. Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., (Chairman), L. E. Anderson, C.B., Sir Alexander F. Bradshaw, K.C.B., K.H.P., W. Babtie, V.C., C.B., C.M.G., W. F. Burnett, Sir Chas. Mc.D. Cuffe, K.C.B., W. Donovan, C.B., J. C. Dorman, C.M.G., W. W. Kenny, K.H.S., Sir Alfred Keogh, K.C.B., J. G. MacNeece, C.B., W. H. McNamara, C.B., C.M.G., G. W. Robinson, C.B., Sir William Taylor, K.C.B., K.H.P., Sir Francis Trevor, K.C.S.I., C.B., H. R. Whitehead, C.B.

Deputy Surgeon-Generals.—W. G. Don, J. F. Jeffcoat.

Colonels.—J. M. Beamish, J. C. Culling, C. E. Faunce, G. T. Goggin, R. I. D. Hackett, C. E. Harrison, C.V.O., J. G. Harwood, S. Hickson, K.H.S., W. H. Horrocks, J. M. Irwin, R. Jennings, W. Johnston, C.B., J. M. Jones, A. Lang Browne, E. H. L. Lynden Bell, W. T. Martin, W. Allan May, C.B., C. H. Melville, H. W. Murray, T. J. O'Donnell, D.S.O., M. W. O'Keeffe, D. O'Sullivan, A. Peterkin, S. K. Ray, R. J. S. Simpson, C.M.G., B. M. Skinner, M.V.O., W. F. Stevenson, C.B., K.H.S., H. O. Trevor, C. R. Tyrrell, S. Westcott, C.M.G., T. P. Woodhouse.

Brigade Surgeons.—J. F. Beattie, W. J. Wilson.

Lieutenant-Colonels.—G. H. Barefoot, W. W. O. Beveridge, D.S.O., R. P. Bond, U. J. Bourke, G. T. Bray, C. H. Burtchaell, A. F. S. Clarke, T. H. F. Clarkson, R. J. Copeland, A. B. Cottell, G. Cree, J. H. Curtis, T. Daly, A. M. Davies, W. B. Day, W. Dick, J. F. Donegan, W. S. Dowman, S. E. Duncan, H. P. Elkington, H. Esmonde White, N. C. Ferguson, C.M.G., B. Forde, T. W. Gibbard, P. C. H. Gordon, J. A. Gormley, H. Grier, F. W. H. D. Harris, L. Haywood, R. Holyoake, G. D. Hunter, D.S.O., H. E. R. James, C.B., A. Kennedy, G. T. Langridge, A. A. Macrobin, J. Maher, J. Meek, S. G. Moores, L. Nash, F. R. Newland, F. P. Nichols, D. M. O'Callaghan, M. O'Halloran, W. W. Pope, G. T. Rawnsley, J. Riordan, H. D. Rowan, M. W. Russell, B. H. Scott, W. H. Starr, C. Stonham, C.M.G., A. A. Sutton, D.S.O., H. N. Thompson, G. T. Trewman, W. Turner, T. du B. Whaite, E. O. Wight, E. M. Wilson, C.B., C.M.G., D.S.O., M. T. Yarr.

Majors.—W. T. P. Adye-Curran, H. P. W. Barrow, H. A. Berryman, E. T. F. Birrell, J. H. Brunskill, G. J. Buchanan, J. H. Campbell, D.S.O., J. E. Carter, A. Chopping, J. B. Clarke, E. W. W. Cochrane, C. C. Cumming, J. Dorgan, H. E. M. Douglas, V.C., D.S.O., H. N. Dunn, P. Evans, P. H. Falkner, H. B. Fawcus, M. H. G. Fell, F. C. Fitzgerald, C. E. P. Fowler, W. B. Fry, R. H. Fuhr, D.S.O., G. H. Goddard, W. S. Harrison, L. W. Harrison, E. C. Hayes, P. H. Henderson, H. A. Hinge, A. W. Hooper, D.S.O., J. W. H. Houghton, H. A. L. Howell, A. J. Hull, F. S. Irvine, J. C. Jameson, J. C. Kennedy, J. W. Langstaff, D. Lawson, I. A. O. MacCarthy, T. C. MacKenzie, D.S.O., G. S. Mansfield, J. F. Martin, T. McDermott, J. R. McMunn, J. G. McNaught, A. H. M. Mitchell, G. A. Moore, C. K. Morgan, E. M. Morphew C. D. Myles, C. J. O'Gorman, D.S.O., S. O'Grady, H. W. O'Reilly, C. E. Pollock, R. L. Popham, E. E. Powell, J. J. W. Prescott, D.S.O., C. W. Profeit, W. Riach, T. F. Ritchie, E. Ryan, E. W. Siberry, A. B. Smallman, S. B. Smith, W. M. B. Sparkes, W. M. H. Spiller, G. B. Stanistreet, E. B. Steele, W. L. Steele, F. A. Symons, A. H. Waring, A. O. B. Wroughton.

Captains.—R. B. Ainsworth, W. J. E. Bell, C. G. Browne, J. H. Campbell, H. St. M. Carter, J. T. Clapham, T. S. Coates, B. Connell, B. A. Craig, J. M. Crawford, M. J. Cromie, N. E. Dunkerton, J. S. Dunne, T. Exton, T. H. Gibbon, M. F. Grant, N. E. J. Harding, G. A. D. Harvey, A. H. Hayes, A. Heaton, M. Keane, R. R. Lewis, R. H. MacNicol, W. McConaghy, T. B. Moriarty, R. E. U. Newman, C. W. O'Brien, K. H. Reed, J. W. L. Scott, H. Spackman, C. R. Sylvester Bradley, G. G. Tabuteau, E. Thurlow Potts, W. Thompson, L. V. Thurston, G. W. W. Ware, D. P. Watson, M. C. Wetherell, C. F. White, W. Wiley, R. C. Wilmot, H. T. Wilson, T. J. Wright, J. R. Yourell.

Lieutenants.—H. S. Blackmore, R. A. Flood, J. L. Huggan, B. H. H. Spence, O. W. J. Wynne.

The following programme of music was performed by selected musicians of the Corps Band, under the direction of Mr. F. Bradley, Bandmaster, R.A.M.C. :—

PROGRAMME OF MUSIC.

1.	*March*	"Vive la Joie"	*Marquina*
2.	*Overture*	"Zehn Mädchen und kein Mann"	*Suppé*
3.	*Selection*	"The Wand of Youth"	*Elgar*
4.	*Valse*	"Donausagen"	*Ziehrer*
5.	*Petite Suite de Concert*		*Coleridge Taylor*
6.	{ *Idylle*		*Elgar*
	{ *Morceau*	"Brise de Soir"	*Gillet*
7.	*Rural Suite*	"Woodland Pictures"	*Fletcher*
8.	*Czardas*	"No. 1"	*Michiels*
9.	*Valse*	"Jeunesse Dorée"	*Waldteufel*
10.	*Selection of Irish Airs*		*Myddleton*
11.	*Serenade*	"Birthday"	*Lincke*
12.	*Two-Step*	"The Wedding Glide"	*Hirsch*

"GOD SAVE THE KING."

After the usual loyal toasts, Sir William Taylor proposed the health of the Chairman, and after speaking of the great services rendered to the Corps by Sir Launcelotte Gubbins, referred with regret to the fact that the present was the last occasion on which he would preside at the Annual Dinner in his capacity as Director-General of the Army Medical Service.

Surgeon-General W. H. McNamara, in a short speech, referred in an appreciative manner to various incidents in the career of the Chairman.

The toast was received with musical honours, and Sir Launcelotte Gubbins, in a few well-chosen words, thanked those present for the cordial manner in which they had drunk his health.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

Report of the Committee for the Year 1912.

(1) The number of subscribers for the year was 175, and the amount of subscriptions received came to £183 12s. 6d.

(2) The total receipts, including rebate of income tax, amounted to £902 10s. 1d., and the expenditure totalled £842 4s. 4d.

(3) A donation of £10 was received from Colonel Ligertwood's Memorial Fund.

(4) Thirty applicants, representing thirty-six orphans, received £745 in grants varying from £10 to £40, according to the circumstances of the applicant.

(5) Surgeon-General C. A. Innes having resigned his trusteeship, Surgeon-General W. Donovan, C.B., kindly consented to act, and was appointed in his place.

List of Subscribers to the above Fund for the Year 1912.

Major J. D. Alexander, Major S. A. Archer, Surgeon-General W. Babtie, V.C., C.B., C.M.G., Captain C. A. J. A. Batch, Lieutenant-Colonel F. B. Beach, Colonel W. G. A. Bedford, C.M.G., Major F. W. Begbie, Mrs. Leo Bent, Major W. T. Black, Lieutenant-Colonel A. T. Blenkinsop, Surgeon-General G. D. Bourke, C.B., Captain L. Bousfield, Captain J. E. M. Boyd, Lieutenant-Colonel J. F. Brodie, Captain W. W. Browne, Major J. M. Buist, Major J. H. Campbell, D.S.O., Captain V. T. Carruthers, Captain F. Casement, Major A. J. Chambers, Captain F. H. M. Chapman, Major A. Chopping, Surgeon-General A. F. Churchill, Captain G. B. T. Churchill, Captain J. T. Clapham, Colonel Sir James Clark, Bart., C.B., Lieutenant-Colonel A. F. S. Clarke, Major E. W. W. Cochrane, Captain F. W. Colton, Deputy Surgeon-General J. S. Comyn, Major J. C. Connor, Lieutenant-Colonel R. J. Copeland, Surgeon-General T. M. Corker, Lieutenant-Colonel A. B. Cottell, E. G. H. Cowan, Lieutenant-Colonel G. Cree, Lieutenant-Colonel H. E. Cree, Surgeon-General Sir Charles Cuffe, Major S. L. Cummins, Lieutenant-Colonel A. M. Davies, Surgeon-General W. Donovan, C.B., Lieutenant-Colonel H. P. J. Elkington, Captain A. C. Elliott, Surgeon-General P. M. Ellis, Major P. Evans, Surgeon-General J. G. H. Evatt, Major N. Faichnie, Lieutenant-Colonel R. J. Fayle, Lieutenant-Colonel R. H. Firth, Major A. A. Fitzgerald, Lieutenant-Colonel H. J. Fletcher, Major J. V. Forrest, Captain F. M. Foulds, Captain W. R. Galwey, Captain J. E. H. Gatt, Lieutenant-Colonel R. J. Geddes, D.S.O., Lieutenant-Colonel J. J. Gerrard, Captain H. G. Gibson, Surgeon-Major-General C. H. Giraud, Lieutenant-Colonel J. Girvin, Colonel G. T. Goggin, Lieutenant-Colonel J. S. Green, Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Colonel R. J. D. Hackett, Lieutenant-Colonel R. H. Hall, Major A. E. Hamerton, D.S.O., Lieutenant-Colonel T. W. O. H. Hamilton, C.M.G., Major W. E. Hardy, Captain F. H. Hardy, Lieutenant-Colonel F. W. H. D. Harris, Colonel J. G. Harwood, Lieutenant-Colonel C. M. Hassard, Colonel H. G. Hathaway, A. S. Heale, Major J. E. Hodgson, Lieutenant-Colonel R. Holyoake, Colonel W. H. Horrocks, Captain G. W. G. Hughes, Colonel J. M. Irwin, Colonel H. E. R. James, Major J. C. Jameson, Colonel R. Jennings, Colonel W. Johnston, C.B., Colonel F. W. C. Jones, Colonel J. M. Jones, Captain W. D. C. Kelly, Surgeon-General W. Kenny, Colonel Kirkpatrick, C.M.G., Lieutenant-Colonel M. Knox, Lieutenant-Colonel W. L. Lane, Captain J. du P. Langrishe, Colonel G. D. N. Leake, Major

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

STATEMENT OF ACCOUNTS.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Balance in Bank, January 1, 1912	313	19	7	By Grants	745	0	0
,, Subscriptions	183	12	6	,, Auditors' Fee	1	1	0
,, Donations	10	0	0	,, Bankers' Charges	0	12	6
,, Rebate of Income Tax	39	3	0	,, Secretarial and Office Expenses	90	0	0
,, Dividends—				,, Stationery	2	2	6
North Eastern Railway, 3 % Debenture Stock (*less* tax £11 13s. 4d.)	188	6	3	,, Printing	1	9	6
London & North Western Railway, 3 % Debenture Stock (*less* tax £11 13s. 4d.)	188	6	10	,, Postage	1	18	10
Midland Railway, 2½ % Debenture Stock (*less* tax £9 6s. 8d)	150	13	4	,, Balance in Bank, December 31, 1912	374	5	10
Caledonian Railway, 4 % Debenture Stock (*less* tax £6 9s. 8d.)	104	14	4				
On £1,177 7s. 9d. Consols	27	14	4				
Refund of Loan to Mrs. C...	10	0	0				
	£1,216	10	2		£1,216	10	2

INVESTMENTS.	£	s.	d.
London & North Western Railway, 3 % Debenture Stock	6,667	0	0
North Eastern Railway, 3 % Debenture Stock	6,666	0	0
Midland Railway, 2½ % Debenture Stock	6,400	0	0
Caledonian Railway, 4 % Debenture Stock	2,780	0	0
Consols	1,177	7	9
	£23,690	7	9

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank Balance and the Investments in Consols, and have inspected the Certificates of the Investments in Railway Stocks as set out.

Portland House,
Basinghall Street, E.C.
January 7, 1913.

(*Signed*) EVANS, PIERSON & CO.
Chartered Accountants.

P. S. Lelean, Captain H. W. Long, Captain W. F. M. Longhnan, Lady Longmore, Captain W. E. C. Lunn, Lieutenant-Colonel J. Maher, Major F. M. Mangin, Colonel W. F. Martin, Colonel W. A. May, C.B., Captain D. F. Mackenzie, Major T. C. Mäkenzie, D.S.O., Lieutenant-Colonel G. S. MacLoughlin, Surgeon-General J. G. MacNeece, Major A. J. McDougall, Captain O. R. McEwen, Colonel H. S. McGill, Major McLaughlin, Surgeon-General N. H. McNamara, C.B., Surgeon-Major E. McSheehey, Colonel H. J. R. Moberly, Major James Moir, Major A. H. Morris, Colonel C. G. Mosse, Lieutenant-Colonel W. J. Mould, Colonel H. W. Murray, Major C. D. Myles, Lieutenant-Colonel L. T. Nash, Colonel J. Lane Notter, Major Ian Paterson, Captain E. C. Phelan, Major E. M. Pilcher, Lieutenant-Colonel H. Pocock, Major J. W. Porter, D.S.O., Colonel R. Porter, Captain J. E. Powell, Lieutenant-Colonel G. F. Poynder, Major C. W. Profeit, Lieutenant-Colonel C. C. Reilly, Colonel E. J. E. Risk, Captain M. B. H. Ritchie, Captain F. E. R. Robinson, Surgeon-General S. B. Roe, C.B., Lieutenant-Colonel H. D. Rowan, Captain J. F. Rugg, Lieutenant-Colonel M. W. Russell, Major George Scott, Captain E. P. Sewell, Colonel C. Seymour, Captain J. A. B. Sims, Deputy Surgeon-General E. M. Sinclair, C.B., Surgeon-General A. F. Sloggett, C.B., C.M.G., Major S. Beylan Smith, Major A. E. Smithson, Captain B. H. H. Spence, Major C. G. Spencer, Captain J. H. Stack, Major H. E. Staddon, Major C. G. G. Stalkartt, Major H. C. F. Stallard, Major E. B. Steel, Captain F. A. Stephens, Lieutenant-Colonel A. A. Sutton, D.S.O., Lieutenant-Colonel J. T. M. Symons, Lieutenant-Colonel C. J. W. Tatham, Captain W. I. Thomson, Surgeon-General T. W. Trevor, Colonel H. O. Trevor, Surgeon-General Sir E. Townsend, K.C.B., Lieutenant R. T. Vivian, Colonel D. Wardrop, C.V.O., Major A. D. Waring, Major B. Watts, Colonel J. H. H. Whipple, Surgeon-General H. R. Whitehead, C.B., Lieutenant-Colonel J. G. Williamson, C.B., C.M.G., D.S.O., Captain M. G. Winder, Lieutenant-Colonel R. J. Windle, Colonel T. P. Woodhouse, Surgeon-General J. A. Woolfreys, K.C.B., C.M.G., K.H.P., Major A. H. O. Young.

PROCEEDINGS OF THE ANNUAL GENERAL MEETING HELD AT THE ROYAL ARMY MEDICAL COLLEGE, ON MONDAY, JUNE 16, 1913.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., D.G.A.M.S., President, in the chair.

(1) The Minutes of the last Meeting were read and confirmed.
(2) The report of the Committee and the accounts for 1912 were adopted.
(3) The following grants recommended by the Committee were approved:—

Three orphans of Staff-Surgeon D. O. D.	£30	0	0
Orphan of Inspector-General R. D.	30	0	0
Orphan of Surgeon-Major C. Q.	30	0	0
Orphan of Inspector-General D. A.	30	0	0
Two orphans of Lieutenant-Colonel H. W. A. M.	40	0	0
Two orphans of Captain W. J. O.	30	0	0
Orphan of Surgeon-General A. S....	10	0	0
Orphan of Lieutenant-Colonel H. T. C.	25	0	0
Orphan of Surgeon-General J. O....	40	0	0
Orphan of Deputy Inspector-General W. F. I.	40	0	0
Two orphans of Surgeon-Major W. P. F.	40	0	0
McGrigor's pension for orphan son of above	10	0	0
Orphan of Surgeon-General T. B.	25	0	0
Orphan of Surgeon-Major B. C. S.	25	0	0
Orphan of Captain H. H. S.	20	0	0
Orphan of Brigade-Surgeon J. H.	25	0	0
Orphan of Major P. G. I.	30	0	0
Three orphans of Captain G. C.	40	0	0
Orphan of Deputy Surgeon-General R. A. C.	25	0	0
Orphan of Surgeon-General T. W. M.	20	0	0
Orphan of Surgeon J. W. C.	20	0	0
Orphan of Surgeon-General J. C. F.	25	0	0
Orphan of Brigade-Surgeon H. M.	20	0	0
Two orphans of Lieutenant-Colonel H. J. P.	20	0	0
Orphan of Lieutenant-Colonel R. G. H....	40	0	0
Thirty-two orphans.	£690	0	0

(4) With reference to Minutes 7 and 8 of the last general meeting, the following recommendations of the committee were approved:—

(*a*) That the name of the Society shall be altered to "Royal Army Medica Corps Officers Benevolent Society."

(*b*) That the book of rules shall be altered as follows:—

(1) "Royal Army Medical Corps Officers Benevolent Society" shall be used throughout the rules instead of "Army Medical Officers Benevolent Society."

(2) In Rule XII the word "three" shall be deleted.

(3) In Rule XIII, line 5, the words "There shall be three trustees who shall be elected for life," shall be deleted and the following words substituted: "the property of the Society shall be vested in trustees who shall never be less than two in number."

(*c*) That Quartermasters of the Corps shall be admitted to the full benefits of the Society with other officers and that Rule I be altered accordingly.

(5) That the following be elected Vice-Presidents for the ensuing year: Colonel J. Lane-Notter; Colonel Sir James Clark, C.B., Bart.; Surgeon-General W. Babtie, V.C., C.B., C.M.G.

(6) The following were elected members of the committee for the ensuing year: Colonel W. H. Horrocks; Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.; Major E. M. Pilcher, D.S.O.; Lieutenant-Colonel A. B. Cottell; Colonel B. Skinner, M.V.O.; Colonel H. L. Lynden-Bell.

(7) Colonel Johnston, C.B., pointed out, in view of new rules being printed, that Sir James McGrigor, Bart., was not the first Director-General of the A.M.S., as stated in the preamble of the rules, but was the second Director-General.

F. W. H. Davie Harris, *Lieutenant-Colonel, Secretary.*

124, *Victoria Street, S.W.*
June 17, 1913.

TYPHOID CARRIERS—PRIZE COMPETITION.

The following notice has been published in the *Berlin. klin. Wochenschrift*, No. 18, May 5, 1913:—

"In order to stimulate research on the methods of curing permanent typhoid carriers an anonymous donor has offered a prize of £500, to be awarded to any person, irrespective of nationality, who can indicate any method of treatment, by which the typhoid bacilli can be entirely eliminated from a permanent carrier within a reasonable time. The absence of *Bacillus typhosus* in the excretions of the carrier must be demonstrated up to six months after completion of the treatment.

"In the event of no completely successful plan of treatment being submitted the Committee is empowered to award a portion of the prize to any competitor whom they may consider to have furnished a partial solution of the question.

"Essays must be submitted written in German, not later than October 1, 1914, to the *Vorsitzenden* (President) of the *Preisrichterkollegium* (Prize Committee). The procedure must be sufficiently fully described to permit of a practical test being undertaken without delay.

"Any medicaments required in the treatment must be supplied free of charge to the Committee. The tests are to be concluded by June 1, 1915.

"The President shall have a casting vote in any decision of the Committee.

"*Prize Committee.*—Professor Dr. v. Schjerning, Professor Dr. Ehrlich, Professor Dr. Gaffky, Professor Dr. Kraus, Professor Dr. Uhlenhuth, Professor Dr. Hoffmann.

"*Berlin, Wilhelmstrasse* 86-87."

BIRTHS.

HIGGINBOTTOM.—On May 23, 1913, at Bloemfontein, the wife of Serjeant J. Higginbottom, R.A.M.C., of a son.

DAWSON.—On May 26, at Kasauli Nursing Home, Kasauli, N. India, the wife of Captain F. W. W. Dawson, of a son.

GRAY.—At Loch Lomond, N.C.R., Dublin, on June 13, the wife of Captain A. C. H. Gray, R.A.M.C., of a son.

GATER.—At the Nursing Home, Sarum Road, Winchester, June 19, the wife of Captain A. W. Gater, R.A.M.C., of a daughter.

DEATHS.

FOGO.—At South Kensington, on May 29, Honorary Deputy Surgeon-General Alexander Scott Fogo, M.D., Surgeon-Major, retired, Medical Department, aged 84. He entered the service as Assistant Surgeon, Royal Artillery, on October 7, 1851; became Surgeon (Staff), December 31, 1858, and served as such also in the 23rd Foot and Depot Brigade, Royal Artillery; became Surgeon-Major, Royal Artillery, October 7, 1871; Surgeon-Major, Rifle Brigade, February 14, 1872; Surgeon-Major, Army Medical Department, March 1, 1873; and retired on half-pay with the honorary rank of Deputy Surgeon-General on November 28, 1876. He served throughout the Eastern campaign of 1854-5 with the Royal Artillery, including the battles of Alma and Balaklava, siege and fall of Sebastopol. (Medal with three clasps, 5th class of the Medjidie and Turkish medal.)

ILLINGWORTH.—On June 16, Honorary Brigade-Surgeon John Alfred Illingworth, Surgeon-Major, retired, Medical Department, aged 78. He entered the service as an Assistant Surgeon (Staff), on June 13, 1859; served as such also in the 57th Foot and Royal Artillery; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, February 11, 1875; and retired on half-pay with the honorary rank of Brigade-Surgeon, December 1, 1880. His war service was: New Zealand War, 1860-1, medal; North-west Frontier of India Campaign, 1863-4; attached to the 7th Foot with the Eusofzai expedition, medal.

JARDINE.—On June 16, Surgeon-Major James Jardine, M.D., retired, Medica Department, aged 82. He entered the service as an Assistant Surgeon, St. Helena Regiment, on December 15, 1854; became Assistant Surgeon (Staff), January 14, 1862; Assistant Surgeon, Royal Artillery, June 3, 1864; Surgeon (Staff), October 23, 1867; Surgeon, 101st Foot, October 22, 1868; Surgeon-Major, Army Medical Department, March 1, 1873; and was placed on the half-pay list on February 5, 1875.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, *Serle Street, London, W.C., not later than the 22nd of the month.*

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A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

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12	8	0 4 6	0 2 0	3 6	0 11	3 2	0 7
	16	0 7 6	0 3 6				
	4	0 3 0	0 1 3				
25	8	0 5 6	0 2 6	4 0	1 3	3 6	0 9
	16	0 9 6	0 4 6				
	4	0 4 0	0 1 8				
50	8	0 6 9	0 3 2	5 0	1 9	4 0	1 0
	16	0 12 0	0 5 3				
	4	0 5 6	0 2 9				
100	8	0 9 0	0 4 4	6 6	3 3	5 6	2 0
	16	0 16 9	0 6 9				
	4	0 8 6	0 4 0				
200	8	0 13 6	0 6 0	9 0	6 3	7 6	4 0
	16	1 3 6	0 8 9				

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major E. T. F. Birrell, Captain and Quartermaster G. F. Short, Staff-Serjeant E. B. Dewberry, Captain A. E. Kidd, Major W. S. Harrison, Captain E. G. R. Lithgow, Lieutenant A. Hood, Lieutenant J. L. Ritchie, Colonel R. H. Firth, Captain S. E. Lewis, Major A. M. MacLaughlin, Captain R. G. S. Gregg.

The following publications have been received:—

British: The St. Thomas's Hospital Gazette, The Hospital, The Middlesex Hospital Journal, The Medical Press and Circular, The Royal Engineers' Journal, Army and Navy Gazette, The Practitioner, The Transvaal Medical Journal, The Australasian Medical Gazette, St. Bartholomew's Hospital Journal, Tropical Diseases Bulletin, The Lancet, The Medical Review, Red Cross and Ambulance News, Annals of Tropical Medicine and Parasitology, Public Health, Guy's Hospital Gazette, South African Medical Record, Proceedings of the Royal Society of Medicine, The Journal of Tropical Medicine and Hygiene, The Journal of State Medicine, Transactions of the Society of Tropical Medicine and Hygiene. The Indian Medical Journal, The Indian Medical Gazette, Journal of the Royal United Service Institution, Bulletin of Entomological Research (Vol. iv, Part 1), *The Army Service Corps Journal.*

Foreign: United States Public Health Service, Deutsche Militärärztliche Zeitschrift, Archiv für Schiffs- und Tropen-Hygiene, Seventh Report of the Henry Phipps Institute, Publications of the Massachusetts General Hospital, Bulletin de la Société de Pathologie Exotique, Revista de Sanidad Militar, Archives de Médecine et Pharmacie Navales, Bulletin de l'Institut Pasteur, Le Caducée, Russian Naval Medical Journal, Giornale di Medicina Militare, Arquivos do Instituto Bacteriologico Camara Pestana, United States Department of Agriculture, Archives de Médecine et de Pharmacie Militaires, Annali di Medicina Navale e Coloniale. Office Internationale d'Hygiène Publique, Bulletin of the Johns Hopkins Hospital, The Military Surgeon.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

The Hon. Manager,
"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

AUGUST, 1913.

MEMORANDA.

THE undermentioned Colonel, retired list, is granted the honorary rank of Surgeon-General, dated July 16, 1913: William F. Stevenson, C.B., M.B., Honorary Surgeon to the King, late Army Medical Service.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Captains to be Majors: Alexander W. Sampey and Henry Rogers, M.B., dated June 27, 1913; Alfred W. A. Irwin, dated July 1, 1913; Stafford M. Adye Curran, dated July 26, 1913.

The undermentioned Lieutenants are restored to the establishment, dated July 1, 1913: Robert B. Price, M.B., and William V. Corbett.

Captain William W. Boyce is placed temporarily on the half-pay list on account of ill-health, dated June 29, 1913.

Quartermaster and Honorary Captain John McClay retires on retired pay, dated July 2, 1913.

Quartermaster and Honorary Captain Thomas F. Cope retires on retired pay, dated July 5, 1913.

Serjeant-Major Robert Henry Green to be Quartermaster with the honorary rank of Lieutenant, dated July 5, 1913.

The King has been pleased to give and grant unto Captain Robert Grenville Anderson, Royal Army Medical Corps, His Majesty's Royal licence and authority to accept and wear the Imperial Ottoman Order of the Medjidieh, Fourth Class, which has been conferred on him by His Highness the Khedive of Egypt, authorized by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by him.

ARRIVAL HOME FOR DUTY.—Major H. M. Morton from South Africa, on July 8.

ARRIVALS HOME ON LEAVE.—Lieutenant-Colonels S. G. Allen and J. J. Gerrard; Majors S. A. Archer, A. W. N. Bowen, M. W. Falkner, A. McMunn, and H. Rogers; Captains D. Ahern, R. G. Anderson, C. R. Millar, R. G. Archibald, A. C. Amy, B. Johnson, and B. W. Rennie; Lieutenant E. T. Gaunt.

POSTINGS.—To the Scottish Command: Captains J. H. Campbell and W. G. Maydon; Lieutenants F. C. Davidson and J. Crocket. To the Northern Command: Captains G. E. Ferguson and G. B. Edwards; Lieutenants C. J. Little and A. A. M. Davies. To the Western Command: Captains V. H. Symons and R. A. Bryden. To the Aldershot Command: Captains G. Ormrod, R. P. Lewis, T. Scatchard, R. H. L. Cordner, W. C. Nimmo, and A. D. O'Carroll; Lieutenants S. D. Large, E. P. A. Smith, J. B. A. Wigmore, J. F. O'Connell, W. O. W. Ball, and J. Rowe. To the Eastern Command: Captains O. Ievers, A. A. Meaden, H. C. Sidgwick, F. E. Roberts, J. E. Hoar, J. M. B. Rahilly, W. Benson, M. J. Cromie, F. C. Sampson, T. S.

Blackwell, and V. T. Carruthers; Lieutenants S. H. Smith and H. Beddingfield. To the Southern Command: Captains H. M. J. Perry, A. D. Fraser, M. Keane, E. T. Potts, E. L. Moss, J. H. Graham, H. O. M. Beadnell, N. Low, J. E. Powell, and G. W. G. Hughes; Lieutenants L. Dunbar and R. Hemphill. To the Irish Command: Captains L. A. A. Andrews, T. C. C. Leslie, C. F. White, G. W. W. Ware, C. E. W. S. Fawcett, R. E. Humfrey, G. G. Tabuteau, T. H. Gibbon, and M. C. Wetherell; Lieutenants H. N. Sealy, E. C. Beddows, C. V. Thornton, C. Helm, W. P. Croker, A. G. Brown, and A. Jackson. To the London District: Captains C. W. O'Brien and R. G. Meredith. For duty at the Queen Alexandra Military Hospital: Captains W. J. E. Bell and H. G. Sherren; Lieutenants C. C. Jones, W. W. Pratt, and A. H. Bridges.

APPOINTMENTS.—Lieutenant-Colonel G. H. Barefoot has been selected for the charge of the Queen Alexandra Military Hospital, London, and Lieutenant-Colonel H. D. Rowan for the charge of King George V. Hospital, Dublin. The following Specialist appointments have been approved as vacancies occur: In *Ophthalmology*, Captain G. W. G. Hughes at Devonport; in *Dermatology*, Captain J. E. Powell at Hilsea, Captain T. Scatchard at Aldershot, Captain C. F. White at Dublin, and Captain F. C. Sampson at Woolwich; in *Operative Surgery*, Captain R. C. Sidgwick at Woolwich, Captain G. G. Tabuteau at Cork, Captain J. M. B. Rahilly at Shorncliffe, and Captain G. E. Ferguson at York; in *Physical Training*, Captain R. P. Lewis at Aldershot; in *Bacteriology*, Captain T. H. Gibbon at Dublin, Captain A. D. Fraser at Netley, and Captain H. M. T. Perry at Devonport; Captain C. J. Coppinger at the Royal Army Medical College.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names: Brevet-Major A. B. Smallman, M.D., of the Victoria University of Manchester; Captain P. Sampson, the Diploma of Public Health of the Royal College of Physicians of Ireland and the Royal College of Surgeons in Ireland; Captain W. F. M. Loughnan, the Diploma in Tropical Medicine and Hygiene of the University of Cambridge; Captain W. P. MacArthur, the Fellowship of the Royal College of Physicians in Ireland; Lieutenant H. S. Blackmore, the Diploma in Public Health of the Royal College of Physicians of London and the Royal College of Surgeons of England; Lieutenant N. T. Whitehead, M.B., B.S., University of London.

RESULTS OF EXAMINATIONS.—The following results of examinations are notified for general information:—

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subject (*b*): Captains H. T. Wilson, C. H. Turner, W. F. H. Vaughan, S. C. Bowle, E. G. Anthonisz, and F. Forest.

ROSTER FOR SERVICE ABROAD.—Majors H. A. Davidson and E. S. Clark have exchanged to higher positions on the roster with Majors F. S. Walker and A. O. B. Wroughton respectively; Captain R. G. Meredith has exchanged to a higher position on the roster with Captain W. Wiley; Quartermaster and Honorary Lieutenant C. H. Cooper has similarly exchanged with Quartermaster and Honorary Lieutenant T. D. Conway.

RETIRED PAY APPOINTMENTS.—The following retired pay appointments are vacant:—

Netheravon; Leicester; St. Peter's, Jersey; Penally.

MEMORANDUM.

It is notified for general information that the undermentioned officers will be required to proceed to the Commands specified during the coming trooping season.

Definite orders will be issued through the usual channels. The probable dates of embarkation are as shown, and will be adhered to as far as service exigencies permit.

Officers of the same rank other than Lieutenant-Colonels ordered to different foreign stations may, by mutual arrangement, have their stations altered; but, while the Director-General is anxious to meet officers' wishes, it is not always possible to give effect to them. Applications for alteration of station, or for exchanges of position, on the roster for service abroad cannot be considered if received after the formal orders have been issued for officers to be held in readiness to embark. The cases of Lieutenant-Colonels will be considered when possible.

Officers proceeding to India, who may be desirous of being posted to any particular Division, may name any three divisions in the Army to which they are detailed, in order of priority of choice, and their wishes will be communicated to the authorities in India with whom the distribution rests.

NORTHERN ARMY, INDIA.

Lieutenant-Colonel T. Du B. Whaite, January 10.
Major E. E. Powell, October 22.
,, E. H. Condon, December 11.
,, B. W. Longhurst, December 11.
,, W. Tibbits, September 24.
,, N. H. Ross, October 9.
,, W. M. H. Spiller, November 21.
,, R. L. Argles, September 12.
,, J. C. Kennedy, November 21.
,, R. L. Popham, January 10.
Captain L. Cotterill, December 11.
,, J. McKenzie, October 22.
,, A. H. Hayes, January 21.
,, H. J. Crossley, October 22.
,, T. S. Coates, December 19.
,, J. B. Meldon, December 19.
,, E. M. Pennefather, November 21.
,, W. F. H. Vaughan, September 12.
,, H. C. Winckworth, February 11.
,, H. W. Russell, October 9.
,, A. T. Frost, September 12.
,, K. A. C. Doig, November 13.
,, R. J. B. Buchanan, January 10.
Lieutenant B. H. H. Spence, December 11.
,, R. Davidson, February 18.
,, H. S. Blackmore, November 21.
,, J. M. Elliott, November 13.
,, D. W. Bruce, November 13.
,, T. E. Osmond, October 22.
,, E. G. H. Cowen, October 22.
,, L. Buckley, October 9.
,, S. P. Sykes, September 24.
,, H. J. G. Wells, September 24.
,, W. Stewart, September 12.
,, A. G. Biggam, February 11.
,, R. K. Mallam, February 18.
,, A. Hood, February 11.
,, E. A. Strachan, February 11.
,, J. H. M. Frobisher, Feb. 11.
,, W. Stevenson, January 21.
,, J. L. Ritchie, January 21.
,, O. W. J. Wynne, September 12.
,, S. J. Higgins, January 10.
,, G. A. Blake, January 10.
,, C. J. H. Little, December 19.
,, R. W. Vint, November 21.
,, E. P. A. Smith, December 11.

SOUTHERN ARMY, INDIA.

Lieutenant-Colonel H. M. Adamson, October 22.
Lieutenant-Colonel J. F. Donegan, Feb. 11.
,, R. Holyoake, Feb. 18.
,, G. A. T. Bray, Jan. 21.
Major C. B. Lawson, September 24.
,, H. W. H. O'Reilly, November 13.
,, L. Addams-Williams, December 19.
Major A. L. Scott, October 22.
,, H. D. Packer, December 19.
,, E. S. Clark, November 13.
,, F. Harvey, October 9.
,, L. L. G. Thorpe, September 12.
,, E. Parkes, January 21.
Captain R. L. V. Foster, January 21.
,, J. A. W. Webster, November 21.
,, F. C. Lambert, September 12.
,, B. G. Patch, February 18.
,, A. C. H. Gray, February 11.
,, T. S. Dudding, November 13.
,, S. L. Pallant, February 18.
,, J. A. Turnbull, September 24.
,, G. S. Wallace, October 9.
,, P. Power, September 24.
,, R. E. Humfrey, January 10.
,, T. C. C. Leslie, December 11.
Lieutenant W. B. Laird, November 21.
,, F. R. B. Skrimshire, Nov. 13.
,, E. T. Vivian, October 22.
,, E. B. Allnutt, October 9.
,, H. C. Todd, September 24.
,, E. C. Deane, October 9.
,, I. R. Hudleston, October 22.
,, W. Macnaughtan, February 18.
,, D. T. M. Large, February 18.
,, W. W. Pratt, February 18.
,, M. Burnett, February 11.
,, C. J. Blaikie, February 11.
,, D. T. Richardson, January 21.
,, C. M. Ingoldby, January 10.
,, P. A. With, December 19.
,, S. J. Barry, December 19.
,, H. W. L. Allott, December 11.

MALTA.

Major C. C. Cumming, September 27.
Captain J. C. G. Carmichael, early Jan.
,, R. H. MacNicol, early January.
,, P. J. Marett, September 3.
Lieutenant W. J. Webster, early January.

EGYPT.

Major H. E. M. Douglas, V.C., D.S.O., September 27.

BERMUDA.

Major G. W. Tate, January 1.

JAMAICA.

Major W. S. Harrison, middle December.
Captain W. McD. MacDowall, mid. Dec.

CEYLON.

Captain R. G. Meredith, September 27.

STRAITS SETTLEMENTS.

Major H. A. Davidson, September 3.
Captain J. G. Bell, September 3.
Lieutenant W. F. Christie, September 3.

SOUTH CHINA.

Major G. B. Crisp, September 27.
,, J. Dorgan, September 27.
Quartermaster and Honorary Lieutenant C. H. Cooper, September 27.

MAURITIUS.

Major D. Lawson, January 1.
Lieutenant H. R. L'Estrange, mid. Feb.

NORTH CHINA.

Quartermaster and Honorary Lieutenant C. H. Smith, September 3.

SOUTH AFRICA.

Quartermaster and Honorary Lieutenant T. E. McColgin, middle February.

The destinations of Lieutenant-Colonels G. D. Hunter, D.S.O., M. W. Russell, and N. Manders will be notified later.

The changes in the list issued in March are due to casualties and to extensions of tours abroad. The "waiting" list will now be as follows:—

Lieutenant-Colonel J. H. E. Austin.
Major C. W. Profeit.
,, L. A. Mitchell.
Captain R. Storrs.
Lieutenant R. C. Carlyle.
,, A. A. M. Davies.
Lieutenant L. Dunbar.
,, H. F. Panton.
Quartermaster and Honorary Captain A. Lunney.
Quartermaster and Honorary Captain A. Wheeler.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

APPOINTMENT.

LANCE-CORPORAL.

1919	Private ..	Vyse, F. H. ..	16.6.13	Special under para. 281 S.O. R.A.M.C.

DISCHARGES.

9697	Qmr.-Serjt.	France, C. W. ..	3.7.13	Termination of second period.
9709	,,	Muggleton, H. ..	13.7.13	,, ,, ,,
9720	S.-Serjt. ..	Hyett, P. D. ..	20.7.13	,, ,, ,,
9709	Serjeant ..	Hughes, A... ..	13.7.13	,, ,, ,,
9716	Corporal ..	Wootten, G. ..	17.7.13	,, ,, ,,
17286	Private ..	Goodchild, C. H. ..	14.7.13	,, ,, ,,
7072	,, ..	Hammond, T. ..	26.6.13	Payment of £10.
1984	,, ..	Whelan, W. ..	10.7.13	Medically unfit.
18910	,, ..	Coggon, R. J. ..	15.7.13	,, ,,
828	,, ..	Livingstone, T. ..	18.7.13	,, ,,
9724	,, ..	Stanley, C... ..	22.7.13	Termination of second period.
7219	,, ..	Hacking, H. ..	5.7.13	Payment of £10.

TRANSFERS TO ARMY RESERVE.

5007	Pte.	Godwin, R. A. ..	7.6.13	5005	Pte.	Webb, D. H. ..	7.6.13
510	,,	Brewer, W. ..	14.6.13	1756	,,	Connolly, F. P.	18.6.13
5013	,,	Kelly, J. W. ..	20.6.13	5018	,,	Cook, W. C. ..	26.6.13
19646	,,	Gosling, H. T. S.	13.6.13	5012	,,	Poole, J. R. ..	20.6.13
6575	,,	Willis, W. H. ..	21.6.13	2103	,,	Hills, W. ..	27.6.13
5025	,,	Parsons, E. ..	28.6.13	5022	,,	McKeon, M. ..	29.6.13
6503	,,	Doherty, J. ..	20.6.13	5017	,,	Edge, C. E. ..	24.6.13
368	,,	Gorman, R. ..	1.7.13	19673	L.-Cpl.	Folwell, F. C. W.	2.7.13
19955	,,	Jefferis, E. W...	9.11.12	4412	Pte.	Wilson, J. ..	12.7.12
5033	,,	Friday, J. ..	15.7.12	5026	,,	Garland, J. E...	16.7.12

TRANSFER FROM OTHER CORPS.

7189	Private ..	Newell, E. F. ..	19.6.13	From 1st Batt. Lincs. Regt.

TRANSFERS TO OTHER CORPS.

9861	S.-Serjeant	Malyon, E.	12.6.13	Sch. of Inst., Leeds T.F. (West Riding).
14706	Serjeant ..	Cairns, J.	7.7.13	3rd W. Lancs. F.A., T.F.

APPOINTED BUGLERS.

6525	Boy ..	Hurley, F. W. T. ..	7.6.13	*Vice* C. Marsh to the ranks.
6550	,, ..	Lever, W. E. ..	3.7.13	,, W. C. Ross ,, ,,

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED AS DISPENSERS.

18330	Corporal ..	Mercer, J. N.	19688	Lce.-Corpl.	Falkingham, T. V.
1919	Private ..	Vyse, F. H.	17058	Corporal ..	Fayter, H.
19032	Corporal ..	Cooke, J.	1869	Private ..	Brason, R.
2198	Private ..	Duggan, J. H. W.	19460	Lce.-Corpl.	Payne, C. J. T.
18312	Corporal ..	Howitt, J.	14337	Corporal ..	Sadler, G.
1808	Private ..	McClay, W. J.	19433	Lce.-Corpl.	Blake, H.
18427	Corporal ..	Barber, P.	954	Private ..	Hallett, H. C.
17390	,, ..	Cowx, R.	2106	,, ..	Macdonald, J.
1866	Private ..	Sugden, W.	2151	,, ..	Church, A. W.
2278	,, ..	Gillbee, J.	911	,, ..	Clough, W.
2102	,, ..	Catton, F. T.	193	,, ..	Truscott, H. P.
1344	,, ..	Shelley, W. C.	11814	Corporal ..	Herington, A. E.
1302	,, ..	Jack, J.	1475	Private ..	Bamford, W. J.

DISEMBARKATIONS FROM ABROAD.

FROM SOUTH AFRICA, PER S.S. "GALIKA," JUNE 12, 1913.

10244	Sjt.-Major	Barnard, A. P.			

FROM SOUTH AFRICA, PER S.S. "ALNWICK CASTLE," JUNE 19, 1913.

19802	Lce.-Corpl.	Leakey, A.	1661	Private ..	Fielding, H. E.
223	Private ..	Peake, W.	828	,, ..	Livingstone, T.
1984	,, ..	Whelan, W. J.			

FROM SOUTH AFRICA, PER S.S. "GERMAN," JULY 8, 1913.

10711	Qmr.-Serjt.	Sharpe, F. W.			

EMBARKATIONS FOR ABROAD.

TO SIERRA LEONE, PER S.S. "OLENDA," JUNE 26, 1913.

12104	Serjeant ..	Newton, J. E.	12815	Serjeant ..	Burgess, G.
18253	,, ..	Suter, J.	19933	Corporal ..	Savegar, W. C.
19102	Corporal ..	Hughes, H. C.			

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

FOR STAFF-SERJEANT.

17555	Serjeant ..	Kinder, M.	17987	Serjeant ..	Betts, A.
16323	,, ..	McKenna, W.	17022	,, ..	Weaver, A. R.

FOR SERJEANT.

19282	Corporal ..	Golden, H.	17454	Corporal ..	Allport, C. E.

FOR CORPORAL.

296	Private ..	Wilson, F. G.	4569	Private ..	Richardson, L.
4321	,, ..	Cruickshank, J.H.L.	4646	,, ..	Taylor, H.
2030	,, ..	Tucker, G. H.	1837	,, ..	Hopkins, C.
5050	,, ..	Birtwistle, W.			

LIST OF SUCCESSFUL CANDIDATES FOR COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS AT THE COMPETITION HELD IN LONDON IN JULY, 1913, FOR WHICH TWENTY-ONE CANDIDATES ENTERED.

Name	Medical school	Qualifications	Marks
Wade, E. W. ..	University Coll., Bristol	M.B., B.S. Univ. Lond. ..	562
*Woodhouse, B. ..	University Coll. Hosp...	M.R.C.S.Eng., L.R.C.P.Lond.	562
*Morrison, W. K.	Edinburgh University ..	M.B., Ch.B. Univ. Edin. ..	554
*Percival, E. ..	Edinburgh University ..	M.B., Ch.B. Univ. Edin. ..	551
Rankin, H. C. D.	Glasgow University ..	M.B., Ch.B. Univ. Glas. ..	550

* These gentlemen, being in possession of certificates obtained in the Officers Training Corps, were awarded Service marks under paragraph 71 of the Regulations for the Officers Training Corps.

NOTES FROM SIMLA.—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director, Medical Services (British Service), writes as follows, June 26, 1913 :—

"*Leave.*—Extension and grant of general leave ex-India to the undermentioned officers have been concurred in: Major S. W. Sweetnam, eight months from May 10, 1913. (On medical certificate reverting to the Home Establishment on completion.) Major A. W. N. Bowen, 195 days from June 4, 1913, not June 14, 1913, as previously stated. Captain J. W. Lane, six months from July 18, 1913. Captain C. P. O'Brien-Butler, leave for eight months from November 22, 1912, extended to July 25, 1913.

"*Extension of Tour of Indian Service.*—The following officer has been allowed to extend his tour of Indian service till trooping season 1914-15: Captain J. E. M. Boyd.

"*Specialists.*—The following officers have been appointed specialists in the subjects and Divisions noted against them: Captain R. C. Paris, dermatology, 4th (Quetta) Division. Captain A. G. Jones, electrical science, 2nd (Rawalpindi) Division. Captain J. H. Duguid, otology.

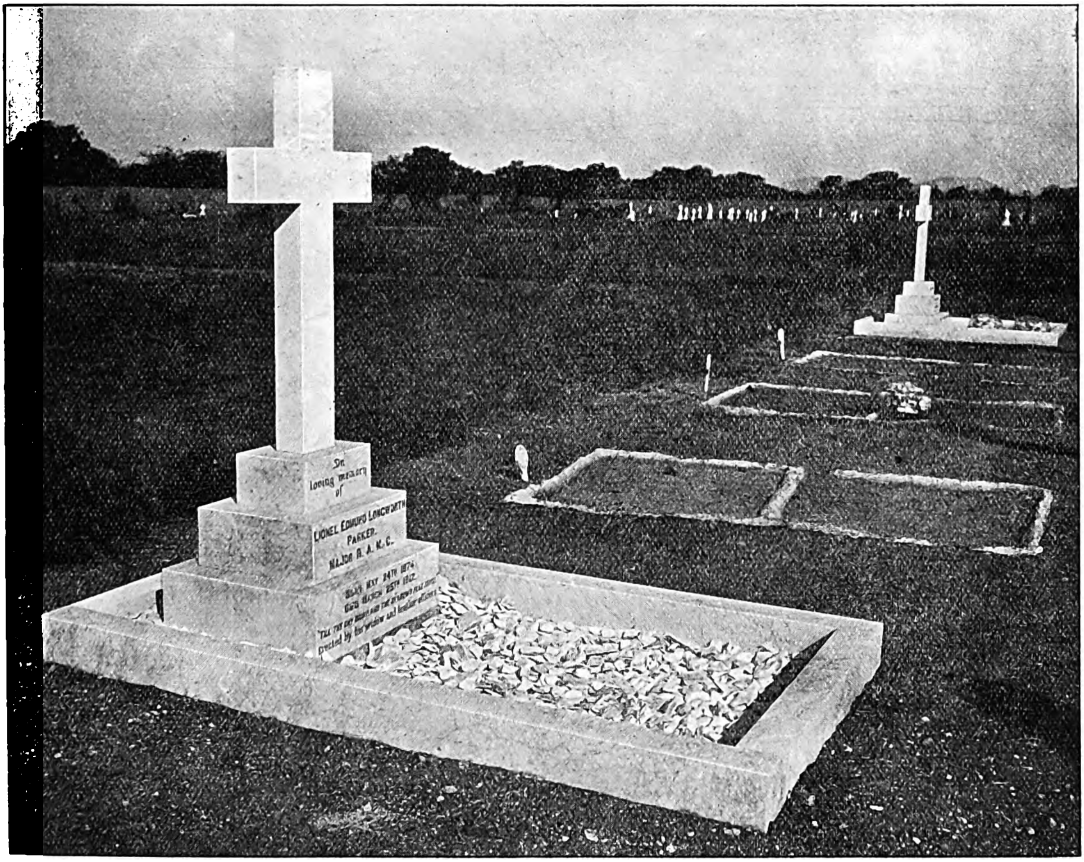
"After somewhat lengthy negotiations the sanction of the Government of India has been obtained for the attendance of a Royal Army Medical Corps officer at each of the four annual classes of instruction, lasting four weeks, in clinical bacteriology and technique, at the Central Research Institute, Kasauli, with effect from the class commencing on July 7, 1913. Captains A. W. Byrne and P. S. Tomlinson are the first officers detailed for these classes."

NOTES FROM POONA. MEMORIAL TO THE LATE MAJOR L. E. L. PARKER, R.A.M.C.—It has been considered desirable to publish the following short statement of the means taken to perpetuate the memory of an officer who was regarded by

all who had the privilege of serving with him as a very able colleague and a great personal friend.

The subscription list was limited to the Army Medical Service and Royal Army Medical Corps officers who were serving in the 6th Division at the time of his death.

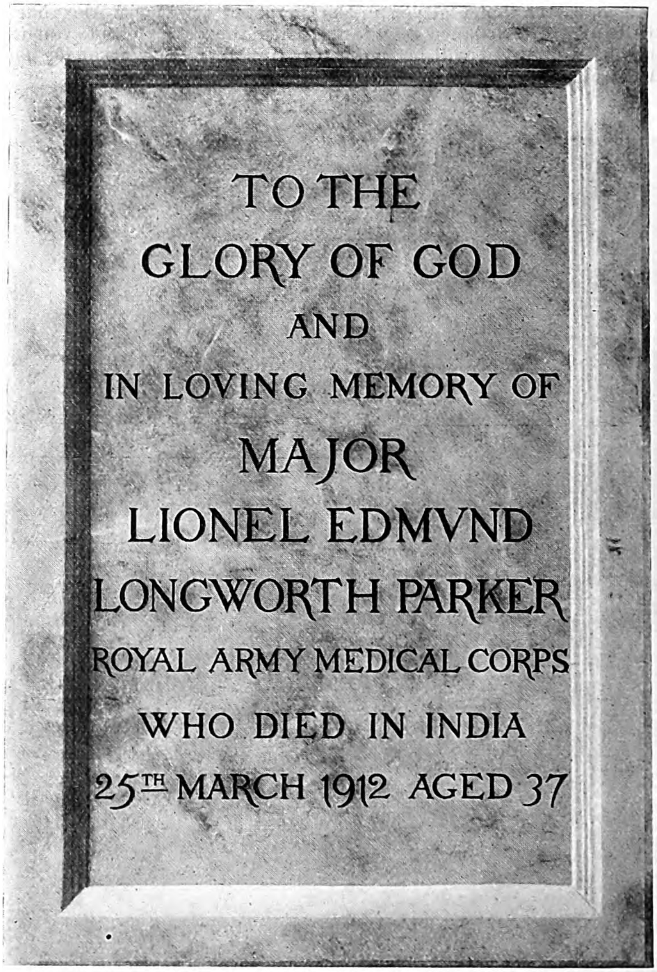
With the fund so raised a white marble cross has been erected in the Cemetery at Poona, and an alabaster tablet placed in the Chapel of the Queen Alexandra Military Hospital, Millbank. The balance remaining when the cost of endowment of these memorials has been defrayed will be handed to Mrs. L. E. L. Parker for her absolute disposal. A list of subscribers is appended.



List of Subscribers.

Surgeon-General A. T. Sloggett, C.B., C.M.G., K.H.P., Surgeon-General T. M. Corker, K.H.P., Colonel W. W. Pike, D.S.O., Lieutenant-Colonel A. T. I. Lilly, Lieutenant-Colonel C. C. Reilly, Lieutenant-Colonel G. G. Adams, Lieutenant-Colonel R. H. Penton, D.S.O., Lieutenant-Colonel J. Girvin, Major O. L. Robinson, Major S. W. Sweetnam, Major S. J. C. P. Perry, Major A. W. N. Bowen, Major H. O. B. Browne-Mason, Major L. Humphry, Major H. K. Palmer, Major H. Simson, Major H. M. Nicholls, Major H. A. Bransbury, Captain E. G. Ffrench, Captain T. C. Lucas, Captain F. A. McCammon, Captain W. C. Smales, Captain C. Scaife, Captain J. A.

Bennett, Captain H. L. Howell, Captain O. C. P. Cooke, Captain F. T. Turner, Captain M. P. Leahy, Captain J. du P. Langrishe, Captain H. V. B. Byatt, Captain C. P. O'Brien-Butler, Captain J. W. Houston, Captain W. J. Dunn, Captain J. Startin.



NOTES FROM SCUTARI.—Lieutenant J. K. Gaunt, R.A.M.C., writes, dated July 9, 1913: "At 11 p.m., June 6, orders were received at Malta to mobilize Section 'B' Field Ambulance complete, less two men, under Major M. H. Babington, R.A.M.C., together with Lieutenant J. K. Gaunt, R.A.M.C., and to be ready to embark at 9 a.m. the following day in H.M.S. 'Black Prince.'

"At 1.30 p.m., June 7, with 300 officers and men of the 2nd Battalion West Yorkshire Regiment, under Lieutenant-Colonel G. F. Phillips, and Captain H. S. McDonald and three men of the Army Service Corps, we steamed out of the Grand Harbour bound, so it was rumoured, for San Giovani Di Medua on the Albanian coast.

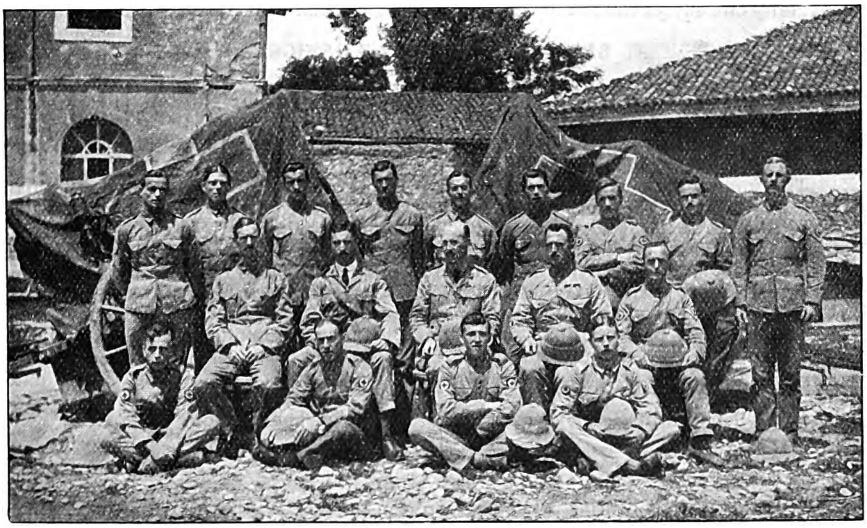
"Twenty-four hours later, after a full power trial, the ships of the International Fleet hove in sight—off the mouth of the River Boyana—and shortly afterwards we

dropped anchor in the Bay off San Giovani. This seaport proved to be no more than a small collection of houses, in the neighbourhood of which were encamped some 5,000 Turkish soldiers, who had been waiting several weeks for transport back to Constantinople.

"We disembarked at dawn next day by means of ships' boats and an ancient Albanian lighter, and at midday commenced the 28 mile march to Scutari, over a shockingly bad road, but through delightfully picturesque and mountainous country.

"The River Drinasi, flowing at the foot of the celebrated Citadel, some two miles from the lately besieged town, was reached at 10 next morning. As the bridge had been destroyed by the Turks during the siege, men and transport were taken over in river boats, and at noon we marched in, headed by the Marine band of H.M.S. 'King Edward VII,' whose detachment we were relieving.

PHOTOGRAPH SECTION "B" FIELD AMBULANCE.



Back Row (*Standing*)—Ptes. Howarth, Robinson, Besznek, Moffett, Johnstone, Connell, Lce.-Cpl. Price, Pte. Boxall, Lce.-Cpl. Carter.
Middle Row (*Sitting*).—Serjt. Mulcahy, Lieut. J. K. Gaunt, Major M. H. Babington, Qmr.-Serjt. Gibbs, Lce.-Cpl. Pearce.
Front Row (*on Ground*).—Ptes. King, Burns, Latimer, and Hardfield.

"The International Force numbered some 1,000 officers and men from England, Germany, France, Italy and Austria.

"When they took over the town some three weeks before, the barracks were evidently in a most insanitary and filthy condition, so much so as to be unfit for occupation. Hence it is easy to understand that, although much had been done towards improving matters, much still remained to be done before the æsthetic nature of the modern soldier could be fully satisfied; so that the Royal Army Medical Corps and Sanitary Police found themselves in their element and all worked with a will to remedy this fifteenth century state of affairs. Burning rubbish and old bedding proved to be rather an alarming proceeding, as much live ammunition was still lying about.

"An old store has been converted into a hospital, and an officers' ward, medical and surgical wards, dispensary and office in the upper storey, men's barrack rooms, a dining room, stores and kitchen on the ground floor, are now in thorough working order. The detachment have proved themselves 'jacks of all trades,' carpenters and bricklayers revealing their hidden talent in an astonishing manner.

"The detachment had some useful practical experience last week, when they transported the last of the Turkish sick and wounded from the improvised Turkish hospital and embarked them on the river steamer for the coast.

"The health of the troops so far has been excellent, the climate very much reminding one of a hot summer at home. The French sailors are in another wing of the barracks and the *entente cordiale* is going strong, in fact boxing contests and football matches take place daily and many of our men are rapidly acquiring a tolerable knowledge of French.

"Visits to the Montenegrin and Turkish entrenched positions have proved of much interest, and many trophies, including shells, bayonets, and even first field dressings, such as they are, have fallen into our hands.

"The regimental band joined us after a fortnight and enlivens proceedings by performing, on alternate days with the Austrian Marine band, in the town gardens, where the majority of the officers of the International Force foregather each evening and exchange courtesies.

"How long we are likely to remain in Scutari no one of course knows, but naturally one enjoys the change here from the glare and heat of a summer in Malta."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants to be Captains: Ian D. Dickson, dated June 17, 1913; Charles S. Sandeman, M.B., dated June 17, 1913.

The undermentioned Lieutenants are confirmed in their rank: Samuel Wright, Frederick Jefferson, M.B., Walter E. Elliot, M.B.

The undermentioned to be Lieutenants (on probation): Norman Veitch Lothian, M.B., late Cadet Serjeant, Glasgow University Contingent, Officers Training Corps, dated May 8, 1913. Cadet Robert Taylor, from the Glasgow University Contingent, Officers Training Corps, dated June 9, 1913. Arthur Patrick Kennedy, dated June 6, 1913. Cadet Corporal William Bird, from the Edinburgh University Contingent, Officers Training Corps, dated June 19, 1913. Cadet George Harris Haines, from the University of London Contingent, Officers Training Corps, dated June 17, 1913. Cadet Serjeant Howell Gwynne Jones, from the University of London Contingent, Officers Training Corps, dated June 20, 1913. Cadet Lance-Corporal John Francis William Meenan, from the Belfast University Contingent, Officers Training Corps, dated June 27, 1913.

Lieutenant Philip S. Vickerman, M.B., resigns his commission.

TERRITORIAL FORCE.

Royal Army Medical Corps.

Lieutenant-Colonel and Honorary Surgeon-Colonel William R. Smith, M.D., on completion of his period of service as Sanitary Officer of a Territorial Division, is retired, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 2, 1913.

Major Peter Caldwell Smith, M.D., from the 2nd London Sanitary Company, Royal Army Medical Corps, is appointed Sanitary Officer of a Territorial Division, dated July 2, 1913.

2nd London Sanitary Company, Royal Army Medical Corps.—Major Charles E. Goddard, M.D., from the Unattached List for the Territorial Force, to be Major, dated July 2, 1913.

6th London Field Ambulance, Royal Army Medical Corps.—Lieutenant Joseph Ernest Ryan, M.D., from the South-Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated June 1, 1913.

1st London (City of London) General Hospital, Royal Army Medical Corps.—Robert James William Oswald (late Captain, List of Officers attached to units other than medical units, Royal Army Medical Corps) to be Captain in the permanent personnel, dated May 22, 1913.

Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Lieutenant Meredith S. Doubble to be Captain, dated April 30, 1913.

3rd Highland Field Ambulance, Royal Army Medical Corps.—Quartermaster and Honorary Captain John Dunn is granted the honorary rank of Major, dated October 7, 1912. Captain Arthur M. Davie resigns his commission, dated July 12, 1913.

2nd West Lancashire Field Ambulance, Royal Army Medical Corps.—Squadron Quartermaster-Serjeant James Bennett, from the Lancashire Hussars Yeomanry, to be Quartermaster, with the honorary rank of Lieutenant, dated July 12, 1913.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Charles A. Stidson, M.D., to be Captain, dated June 7, 1913.

1st West Riding Field Ambulance, Royal Army Medical Corps.—Herbert Barrett Pope to be Lieutenant, dated June 2, 1913.

2nd Welsh Field Ambulance, Royal Army Medical Corps.—Lieutenant-Colonel Alfred W. Sheen, M.D., is seconded under the conditions of paragraph 112 of the Territorial Force Regulations, dated July 10, 1913.

2nd Eastern General Hospital, Royal Army Medical Corps.—Captain James A. Rooth to be Major, dated July 12, 1913.

Lowland Mounted Brigade Field Ambulance, Royal Army Medical Corps.—Captain James Bruce, M.B., to be Major, dated June 10, 1913.

3rd Home Counties Field Ambulance, Royal Army Medical Corps.—Frederic Edwin Hubert Keogh to be Lieutenant, dated June 13, 1913.

3rd West Lancashire Field Ambulance, Royal Army Medical Corps.—John Rupert Saywell is appointed Transport Officer, with the honorary rank of Lieutenant, dated June 3, 1913.

3rd North Midland Field Ambulance, Royal Army Medical Corps.—Lieutenant Ernest W. Strange, M.D., to be Captain, dated June 24, 1913.

2nd Eastern General Hospital, Royal Army Medical Corps.—Herbert John Walker, F.R.C.S. (Edin.), to be Lieutenant, dated July 16, 1913.

1st Northern General Hospital, Royal Army Medical Corps.—The undermentioned Lieutenant-Colonels resign their commissions, dated July 16, 1913:—

David Drummond, M.D.

Sir Thomas Oliver, Knight, M.D.

The undermentioned Majors to be Lieutenant-Colonels, dated July 16, 1913:—

Thomas Beattie, M.D.

William E. Hume, M.B.

The undermentioned Captains to be Majors, dated July 16, 1913:—

George G. Turner, M.B., F.R.C.S.

Alfred Parkin, M.D., F.R.C.S.

Officers attached to other Units.

Captain Donald G. Campbell, M.B., to be Major, dated May 20, 1913.

Captain Charles E. Humphreys to be Major, dated June 7, 1913.

Major John L. Thomas, C.B., F.R.C.S., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 2, 1913.

Lieutenant William J. Gray to be Captain, dated July 1, 1913.

Joseph Wilkie Scott, M.D., to be Lieutenant, dated May 19, 1913.

Alfred Thomas Griffiths (late Surgeon-Lieutenant, 1st Volunteer Battalion, Duke of Wellington's (West Riding Regiment)) to be Captain, dated July 5, 1913.

Lieutenant Harold L. Heslop, M.D., to be Captain, dated July 11, 1913.

Major John Ritchie, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 12, 1913.

Lieutenant-Colonel Henry George Falkner, from the Unattached List for the Territorial Force, to be Lieutenant-Colonel, dated July 16, 1913.

George James Masson Martin to be Lieutenant, dated June 5, 1913.

Noel Godfrey Chavasse, M.B. (late Cadet Lance-Serjeant, Oxford University Contingent, Senior Division, Officers Training Corps), to be Lieutenant, dated June 2, 1913.

Peyton Tollemache Warren to be Lieutenant, dated June 9, 1913.

Charles Stewart Wink (late Second Lieutenant, 5th Battalion, The Essex Regiment) to be Lieutenant, dated July 12, 1913.

Supernumerary for service with the Officers Training Corps.

Lieutenant Rudolph A. Peters (serving with the Cambridge University Contingent, Senior Division, Officers Training Corps) resigns his commission, dated July 12, 1913.

TERRITORIAL FORCE RESERVE.

INFANTRY.

Surgeon-Major Charles John Macalister, M.D., from the 10th (Scottish) Battalion, The King's (Liverpool Regiment), to be Surgeon-Major, dated June 2, 1913.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Charles John Jacomb-Hood, from the 2nd Eastern General Hospital, Royal Army Medical Corps, to be Lieutenant-Colonel, dated July 12, 1913.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Staff Nurses: Miss M. V. Bonallo, to Devonport, from Cosham; Miss K. D. G. Dickinson, to Aldershot, on provisional appointment; Miss C. M. Gambardella, to Chatham, on provisional appointment; Miss E. J. Barrow, to Cork, from Chatham.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF CAPTAINS FOR PROMOTION TO MAJOR.

List of subjects for essays. Tuesday, July 15, 1913. From 10 a.m. to 1 p.m. [N.B.—*One subject only to be selected.*]

Medical.—(1) Discuss the causes of enlargement of the spleen and their differentiation.

(2) The complications of diabetes mellitus—their recognition and appropriate treatment.

(3) Write an essay on the knee-jerk.

(4) The ætiology, clinical features and treatment of gastrectasis.

Tropical Medicine.—(1) Discuss the principal forms of chronic diarrhœa in the Tropics from the point of view of their differential diagnosis, symptomatology and treatment.

(2) Write an essay on cholera with especial reference to its prevention and treatment.

Surgical.—(1) Appendicitis, its diagnosis in its early stages, its ætiology, pathology and complications.

(2) How may the following conditions be differentiated: ruptured gastric ulcer, hepatic and renal colic due to calculi?

(3) What are the lesions most likely to ensue from a severe fall on the back of the head? How may they be diagnosed?

(4) In fracture dislocation between the sixth and seventh cervical vertebræ what are the symptoms, prognosis and treatment?

Medicine.—(Written.) Tuesday, July 15, 1913. From 2.30 to 5.30 p.m.

(1) Describe the symptoms in variola, paying special attention to the rash, and discuss the differential diagnosis between modified variola and varicella.

(2) What forms of new growth occur in the mediastinum? Describe their physical signs and symptoms. How would you distinguish between a mediastinal growth and an aneurism?

(3) Describe the nervous symptoms which may arise in lead poisoning. What treatment would you adopt in each case?

(4) Describe the commoner complications of enteric fever; and discuss their prevention and cure.

(5) Discuss the diagnosis and treatment of pernicious attacks of malignant tertian malaria.

Surgery.—(Written.) Wednesday, July 16, 1913. From 10 a.m. to 1 p.m.

(1) In paraplegia arising from spinal caries explain the indications for operative treatment, the nature and scope of the operations proposed, and the results expected.

(2) Discuss the symptoms and signs of hour-glass contraction of the stomach, and describe the various ways in which this condition may be remedied by peration.

(3) Classify simple fractures which occur in the upper third of the radius, and explain how you would treat these injuries.

(4) Differentiate coxa vara from other affections of the hip, and describe its management.

Military Surgery, and Refraction and Skiagraphy.—(Written.) (As part of the Examination in Surgery.) Wednesday, July 16, 1913. From 2.30 to 5.30 p.m.

Military Surgery.—(1) What are the clinical conditions which may follow a small-bore gunshot wound of the femoral artery? Give the symptoms, prognosis and treatment of each.

(2) Give the diagnosis, prognosis and treatment of gunshot injuries of the spine.

Skiagraphy.—(3) Describe an X-ray tube, naming and giving the use and object of the various parts? What is the object of an "osmosis regulator"?

(4) Enumerate the various kinds of "break" or "interrupter" with which you are acquainted, giving the principle of action in each case, and stating which, in your opinion is the (1) most efficient, (2) best for field service work.

Refraction.—(5) What is the standard of vision required for a recruit? In a man who has passed this test, what refractive errors are likely to give subsequent trouble?

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF APRIL, MAY, AND JUNE, 1913.

Title of Work and Author	Edition	Date	How obtained
Diseases of the Stomach. By Boas and Bernheim		1907	Library Grant.
Differential Diagnosis. By R. C. Cabot, M.D. ..	2nd	1913	,, ,,
The Surgery of Childhood. By De Forest Willard, M.D.		1910	,, ,,
A Text-Book of Operative Surgery. By W. S. Bickham, M.D.		1910	,, ,,
Röntgen Rays and Electro-Therapeutics. By M. K. Kassabian, M.D.	2nd	1910	,, ,,
Diseases of the Nose and Throat. By D. B. Kyle, M.D.	4th	1907	,, ,,
24th, 25th and 26th Annual Reports of the Bureau of Animal Industry, 1907, 1908 and 1909		1909-11	,, ,,
Appendicitis and other Diseases of the Vermiform Appendix. By H. A. Kelly, M.D.		1909	,, ..
Medical Electricity and Röntgen Rays. By S. Tousey, M.D.		1910	,, ,,
Spirochætes. By W. C. Bosanquet, M.A., M.D. ..		1911	,, ,,
Modern Surgery, General and Operative. By J. C. Da Costa, M.D.		1912	,, ,,
Diseases of the Anus, Rectum and Sigmoid. By S. T. Earle, M.D.		1911	,, ,,
Hæmorrhage and Transfusion. By G. W. Crile ..		1909	,, ,,
Surgical Diagnosis. By D. N. Eisendrath, M.D...		1909	,, ,,
A Text-Book of Minor Surgery. By E. M. Foote, M.D.		1912	,, ,,
Clinical Lectures and Addresses on Surgery. By C. B. Lockwood		1907	Presented by Lieut.-Col. M. W. Russell, R.A.M.C.
Functional Nervous Disorders in Childhood. By L. G. Guthrie, M.A., M.D.		1907	,, ,,
Essentials of Milk Hygiene. By C. O. Jensen. Translated by L. Pearson	2nd	1909	Library Grant.
Notes on Maps and Map Reading. By Lieut.-Col. H. M. E. Brunker	3rd	1910	,, ,,
Serum Diagnosis of Syphilis. By Hideyo Noguchi, M.D.	3rd	1912	,, ,,
The Experimental Prophylaxis of Syphilis. By Dr. Paul Maisonneuve. Translated by F. L. De Verteuil		1908	,, ,,
A Manual of Midwifery. By H. Jellett, B.A., M.D.	2nd	1910	,, ,,
The Practice of Midwifery. By Galabin and Blacker	7th	1910	,, ,,
Text-Book of Gynecological Diagnosis. By Winter and Ruge. Translated by John G. Clark, M.D.		1909	,, ,,
Foods and their Adulteration. By W. Wiley, M.D.	2nd	1911	,, ,,
Diseases of Infancy and Childhood. By H. Koplik, M.D.	3rd	1910	,, ,,
The Chemical Basis of Pharmacology. By Francis and Fortescue-Brickdale		1908	,, ,,
Surgical Diagnosis. By E. Martin, M.D.		1910	,, ,,
Urgent Surgery. By Felix Legars. Translated by W. S. Dickie. 2 vols.		1911-12	,, ,,
The Cambridge Natural History. Edited by Harmer and Shipley. Vols. ii, iii, iv, vii, viii, ix and x		1909-13	,, ,,

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Pathogenic Micro-Organisms, including Bacteria and Protozoa. By W. H. Park, M.D. Assisted by Anna W. Williams, M.D.	3rd	1908	Library Grant.
The Practice of Medicine. By M. Charteris, M.D. Edited by F. J. Charteris, M.D.	9th	1909	,, ,,
Diseases of the Skin. By Sir Malcolm Morris, K.C.V.O.	5th	1911	,, ,,
Elements of Pharmacy, Materia Medica and Therapeutics. By Sir William Whitla, M.A., M.D.	9th	1910	,, ,,
Modern Methods of Water Purification. By Don and Chisholm		1911	,, ,,
Diseases of the Stomach. By S. H. Habershon, M.D.		1909	,, ,,
Experimental Embryology. By J. W. Jenkinson, M.A.		1909	,, ,,
Cast-Iron House Drainage. By G. J. G. Jenson, C.E.		1908	,, ,,
Essentials of Bacteriology. By M. V. Ball.. ..	6th	1910	,, ,,
Diseases of Infancy and Childhood. By L. E. Holt, M.D. Assisted by John Howard, M.D.	6th	1912	,, ,,
Ophthalmic Surgery and Medicine. By W. H. H. Jessop, M.A.	2nd	1908	,, ,,
The Planning of Fever Hospitals and Disinfecting and Cleansing Stations. By Albert C. Freeman, C.S.A.		No date	,, ,,
An Introduction to Dermatology. By N. Walker, M.D.	5th	1911	,, ,,
Tumours of the Cerebellum. By John Wyllie, M.D.		1908	,, ,,
Inborn Errors of Metabolism. By A. E. Garrod, D.M., M.A.		1909	,, ,,
Manual of Pathology and Morbid Anatomy. By T. H. Green, M.D. Revised by W. C. Bosanquet, M.D.	11th	1911	,, ,,
Manual of Diseases of the Ear. By T. Barr, M.D., and J. Stoddart Barr, M.B.	4th	1909	,, ,,
The Radioactive Substances, their Properties and Behaviour. By Walter Makower		1908	,, ,,
Common Affections of the Liver. By W. Hale White, M.D.		1908	,, ,,
Diseases of the Nervous System. By H. Campbell Thomson, M.D.		1908	,, ,,
The Principles of the Treatment of Gout. By A. W. Sikes, M.D.		1907	,, ,,
The Surgery of the Ear. By Samuel J. Kopetzky, M.D.		1908	,, ,,
Movable Kidney, its Pathology, Symptoms and Treatment. By Wilson and Howell		1908	,, ,,
Defects in Plumbing and Drainage Work. By Francis Vacher	3rd	1903	,, ,,
Properties of Matter. By Poynting and Thomson	5th	1909	,, ,,
Treatise on Diseases of the Skin. By H. W. Stelwagon, M.D.	6th	1911	,, ,,
Treatment of the Diseases of Children. By C. G. Kerley	2nd	1911	,, ,,
A Text-Book of Physiology. By W. H. Howell, M.D.	4th	1911	,, ,,
The Principles of Hygiene. By D. H. Bergey, M.D.	3rd	1910	,, ,,

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Treatment of Internal Diseases. By Dr. Norbert Ortner. Edited by N. B. Potter, M.D.	4th	1908	Library Grant.
Methods and Devices for Bacterial Treatment of Sewage. By W. M. Venable, M.S.		1908	,, ,,
Text-Book of Nervous Diseases. By Prof. H. Oppenheim. Translated by A. Bruce, M.D. 2 vols.	5th	1911	,, ,,
Diet in Health and Disease. By Friedenwald and Ruhräh	3rd	1909	,, ,,
Diseases of the Digestive Canal. By Dr. Paul Cohnheim. Translated by D. Fulton, M.D.	2nd	1911	,, ,,
Exercise in Education and Medicine. By R. Tait McKenzie, B.A., M.D.		1910	,, ,,
Tuberculosis in Infancy and Childhood. By Various Authors. Edited by T. N. Kelynack, M.D.		1908	,, ,,
Infectious Diseases. By C. B. Ker, M.D.		1909	,, ,,
Portfolio of Dermochromes. By Professor Jacobi. English Adaptation of Text by J. J. Pringle, M.B. 3 vols.	3rd	1910	,, ,,
Lumley's Public Health Acts. 2 vols.	7th	1908	,, ,,
The Campaign of Chancellorsville. By John Bigelow, jun.		1910	,, ,,
Cavalry Reconnaissance. By Col. W. W. Norman		1911	,, ,,
Strategy in a Nutshell. By Capt. F. F. Boyd ..		1910	,, ,,
The Defence of Plevna, 1877. By Capt. F. W. von Herbert		1911	,, ,,
The Great Illusion. By Norman Angell		1912	,, ,,
The Campaign of Gettysburg. By Miles		No date	,, ,,
The Journal of an Army Surgeon during the Peninsular War. By Charles Boutflower		1912	,, ,,
Our Cavalry. By Major-General M. F. Rimington, C.V.O., C.B.		1912	,, ,,
From the Black Mountain to Waziristan. By Col. H. C. Wylly, C.B.		1912	,, ,,
The Outlines of Military Geography. By Col. A. C. Macdonnell. 2 vols.		1911	,, ,,
Organization. How Armies are formed for War. By Col. H. Foster, R.E.		1911	,, ,,
Army Organization and Administration. By Capt. D. L. Pritchard, D.S.O.		1910	,, ,,
Hannibal's March through the Alps. By Spenser Wilkinson		1911	,, ,,
Story of the Franco-Prussian War, 1870-71. From July 15 to August 18, 1870. By Lieut.-Col. H. M. E. Brunker		1903	,, ,,
Story of the Russo-Turkish War (in Europe), 1877-78. By Lieut.-Col. H. M. E. Brunker. 2 vols.		1911	,, ,,
Napoleon's European Campaigns, 1796-1815. By Capt. F. W. O. Maycock, D.S.O.		1910	,, ,,
A Short History of the Chief Campaigns in Europe since 1792. By Gen. A. von Horsetzky. Translated by Lieut. K. B. Ferguson, R.G.A.		1909	,, ,,
Wellington's Army, 1809-1814. By C. W. C. Oman		1913	,, ,,
The Geology and Geography of Northern Nigeria. By J. D. Falconer, M.A.		1911	,, ,,

List of Books added to the Library—*Continued.*

Title of Work and Author	Edition	Date	How obtained
The Second Afghan War, 1878-79-80. By Col. H. B. Hanna. 3 vols.		1899-1910	Library Grant.
The Gates of India. By Col. Sir T. Holdich, K.C.M.G.		1910	,, ,,
Overland to India. By Sven Hedin. 2 vols. ..		1910	,, ,,
Die Altrömischen Militärärzte. Von Dr. Haberling		1910	,, ,,
Collected Papers by the Staff of St. Mary's Hospital. Mayo Clinic. 1905-1909.		1911	,, ,,
Therapeutics of the Circulation. By Sir Lauder Brunton, Bt., M.D.		1908	,, ,,
Tuberculin in the Diagnosis and Treatment of Tuberculosis. By W. C. Wilkinson, B.A., M.D.		1912	,, ,,
The Bacterial Diseases of Respiration, and Vaccines in their Treatment. By R. W. Allen, M.D.		1913	Editor, Journal.
Military Report on Jamaica. Vol. i. General Staff, 1912		1913	Commandant's Office.
The Eastern Association of Tropical Medicine. Transactions of the Second Bienuial Congress, held at Hong-Kong, 1912. Edited by F. Clark, M.D.		1912	Editor, Journal.
Catalogue of the War Office Library. Part III. (Subject Index.) First Annual Supplement. January to December, 1912		1913	War Office.
Plans of Hospital Arrangements in the South African War			Presented by Col. R. J. S. Simpson, C.M.G.
Photographs of South African General Hospitals ..			,, ,,
Portable Folding Stretcher. (Photograph.) Surg.-Capt. Fennick			,, ,,
Chloride of Lime in Sanitation. By A. H. Hooker		1913	Editor, Journal.
Notes on Sanitation for Regimental Sanitary Orderlies and other N.C.O's. and Men. By Assistant-Surgeon J. V. Lopez, I.S., M.D.		1912	,, ,,
How to Cut the Drug Bill. By A. H. Hart, M.S. ..	3rd	1913	,, ,,
Sclero-Corneal Trephining in the Operative Treatment of Glaucoma		No date	,, ,,
Medical Electricity. By H. Lewis Jones, M.A., M.D.	6th	1913	,, ,,
Annual Report of the Surgeon-General of the Public Health Service of the United States for the Fiscal Year 1912		1913	,, ,,
Lessons on Elementary Hygiene and Sanitation, with special reference to the Tropics. By W. S. Prout, C.M.G., M.B.	3rd	1913	,, ,,
Skizzen eines Feldarztes aus Montenegro. Von Hermann von Schrötter		1913	,, ,,
The Mineral Waters of Vichy. By Dr. Charles Cotar		1913	,, ,,
Medical Annual		1913	,, ,,
Bacon's Large-print Map of the Transvaal, Orange Free State, Cape Colony, &c.			Presented by Lieut.-Col. A. B. Cottell, R.A.M.C. (Retired pay).
Special Map of North-west Cape Colony, showing the Rebel Area			,, ,,

List of Books added to the Library—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Jeppe's Map of the Transvaal. Sheet No. 4, Sheet No. 5, and Sheet No. 6			Presented by Lieut.-Col. A. B. Cottell, R.A.M.C. (Retired pay).
Imperial Map of South Africa, Bloemfontein, Bloemhof, Harrismith, Hoopstad, Heidelberg, Kroonstad, Krugersdorp, Ladybrand, Mafeking, Pitsani, Warrenton, Vryburg, Vredi, Winburg			,, ,,
The Commoner Diseases of the Eye. By C. A. Wood, M.D., and T. A. Woodruff, M.D.	3rd	1907	Library Grant.
The Medical Complications, Accidents, and Sequels of Typhoid Fever and other Exanthemata. By Hare and Beardsley		1909	,, ,,
The Provisioning of the Modern Army in the Field. By Brigadier-General H. G. Sharpe, U.S.A. Revised by Capt. F. A. Cook, U.S.A.		1909	,, ,,
Balck's Tactics. Vol. i. Infantry. Translated by Lieut. W. Krueger, U.S.A.		1911	,, ,,
Hygiene and Public Health. By Whitelegge and Newman	12th	1911	,, ,,
The Microscopical Examination of Food and Drugs. By H. G. Greenish	2nd	1910	,, ,,
A Text-Book of Medical Jurisprudence and Toxicology. By John Glaister, M.D.		1910	,, ,,
Insects and Disease. By R. W. Doane, A.B. ..		1910	,, ,,
The Modern Treatment of Alcholism and Drug Narcotism. By C. A. McBride, M.D.		1910	,, ,,
Domestic Sanitation and Plumbing. By A. Herring-Shaw, R.P.C. Parts I and II		1909-11	,, ,,
The Carrier Problem in Infectious Diseases. By Ledingham and Arkwright		1912	,, ,,
Text-Book of Massage. By L. L. Despard		1911	,, ,,
Veterinary Pathology. By Friedberger and Fröhner. Translated by M. H. Hayes. 2 vols.	6th	1908	,, ,,
A Practical Guide to Meat Inspection. By Walley and Stockman	5th	1909	,, ,,
The Basutos. By Sir Godfrey Lagden, K.C.M.G. 2 vols.		1909	,, ,,
A Soldier's Recollections. By Randolph H. McKim		1910	,, ,,
Lord Clive's Right-hand Man. By Col. L. Forde..		1910	,, ,,
Cavalry in War and Peace. By Gen. F. von Bernhardi. Translated by Major G. T. M. Bridges, D.S.O.		1910	,, ,,
The Life of Field-Marshal Sir Frederick Paul Haines. By Robert S. Rait		1911	,, ,,
International Law. By F. E. Smith, K.C., M.P. Revised and Enlarged by J. Wylie	4th	1911	,, ,,
Medical *Vade Mecum* in German and English. By B. Lewis		1912	,, ,,
The Practitioner's Medical Dictionary. By G. M. Gould, A.M., M.D.	2nd	1911	,, ,,
Hydrotherapy. By G. Hinsdale, A.M., M.D. ..		1910	,, ,,
Text-Book of Small Arms, with Tables		1909	,, ,,
Nervous and Mental Diseases. By Church and Petersen	7th	1911	,, ,,

List of Books added to the Library—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Physical Diagnosis. By John C. Da Costa, jun., M.D.	2nd	1911	Library Grant.
Renal Hygiene. By T. W. Brewer, M.D.		1909	,, ,,
Principles of Therapeutics. By A. Manquat. Translated by S. Gabriel, M.D.		1910	,, ,,
Examination of Water (Chemical and Bacteriological). By W. P. Mason	4th	1912	,, ,,
Diagnostic Therapeutics. By A. Adams, A.M., M.D.		1910	,, ,,
Diseases of the Heart and Aorta. By A. D. Herschfelder	2nd	1913	,, ,,
Manual of Toxicology. By R. A. Witthaus, M.D.	2nd	1911	,, ,,
Dyspepsia, its Varieties and Treatment. By W. S. Fenwick, M.D.		1910	,, ,,
Applied Anatomy. By G. G. Davis	2nd	1913	,, ,,
A Text-Book of Bacteriology. By Hiss and Zinsser		1912	,, ,,
Analysis of Drugs and Medicine. By B. E. Nelson		1910	,, ,,
The Mechanism of the Heart-beat. By T. Lewis, M.D.		1911	,, ,,
Practical Physiological Chemistry. By Philip B. Hawk.	3rd	1910	,, ,,
Diseases of the Stomach, Intestines, and Pancreas. By R. C. Kemp, M.D.	2nd	1912	,, ,,
Diagnostic Methods. By R. W. Webster, M.D. ..		1909	,, ,,
Disease of the Pancreas, its Cause and Nature. By E. L. Opie.	2nd	1910	,, ,,
A Text-Book of Pathology. By Joseph McFarland, M.D.	2nd	1910	,, ,,
The American Civil War. By John Formby ..		1910	,, ,,
The Reality of War. By Major S. L. Murray ..		1909	,, ,,
My Experiences at Nan Shan and Port Arthur. By Lieut.-General N. A. Tretyakov. Translated by A. C. Alford, R.A.		1911	,, ,,
General Gatacre, 1843-1906. By Beatrix Gatacre		1910	,, ,,
The Life of Sir William Howard Russell, C.V.O., LL.D. By John B. Atkins. 2 vols.		1911	,, ,,
History of South Africa since 1795. By G. McCall Theal, LL.D. 5 vols.		1908-10	,, ,,
Le Japon Militaire, L'Armée et la Marine Japonaises en 1910. By J. C. Balet.		1910	,, ,,
Diseases of the Organs of Respiration. By S. West, M.D. 2 vols.		1909	,, ,,
The Diagnosis and Treatment of Pulmonary Tuberculosis. By F. M. Pottinger, M.D.		1908	,, ,,
Abdominal Tuberculosis. By A. E. Maylard, M.B.		1908	,, ,,
Medical Jurisprudence for India. By Lyon and Waddell.	4th	1909	,, ,,
Diseases of the Stomach and Upper Alimentary Tract. By A. Bassler, M.D.	2nd	1913	,, ,,
A Treatise on Diseases of the Eye. By John E. Weeks, M.D.		1911	,, ,,
Fractures and their Treatment. By J. H. Pringle		1910	,, ,,
Rational Immunization in the Treatment of Pulmonary Consumption. By E. C. Hort		1909	,, ,,
Allen's Commercial Organic Analysis. Vol. vii. Edited by Davis and Saddler	4th	1913	,, ,,
Veterinary Bacteriology. By R. E. Buchanan ..		1911	,, ,,

List of Books added to the Library—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Nervous and Mental Diseases. By C. S. Potts, M.D.	2nd	1908	Library Grant.
The Etiology of Endemic Goitre. By R. McCarrison, M.D.		1913	Editor, Journal.
Manual of Operative Surgery. By John F. Binnie, A.M , C.M.	5th	1912	,, ,,
Practical Guide to Diseases of the Nose, Throat, and Ear. By W. Lamb, M.D.	3rd	1913	,, ,,
Notes on the Therapeutics of Radium in the Bath Waters. Compiled by John Hatton		1913	,, ,,
Diagnosis of Bacteria and Blood-Parasites. By E. P. Minett	2nd	1913	,, ,,
A Manual of Surgical Treatment. By Cheyne and Burghard. Vol. iv. New Edition. Revised by Legg and Edmunds		1913	,, ,,
Lehrbuch der Militär-Hygiene. By Bischoff, Hoffmann, and Schwiening. Vol. v		1913	,, ,,
A Text-Book of Genito-urinary Diseases. By Dr. Leopold Casper. Translated by C. W. Bonney, M.D.	2nd	1912	Library Grant.
Diseases of the Nose, Throat, and Ear. By Knight and Bryant	2nd	1909	,, ,,
General Surgery. By Lexer and Bevan. Translated by D. Lewis, M.D.		1908	,, ,,
Practical Points in the Use of X-ray and High-frequency Currents. By A. Judd, M.D.		1909	,, ,,
Text-Book of Diseases of the Nose, Throat, and Ear. By F. R. Packard, M.D.	2nd	1913	,, ,,
Anatomy of the Brain and Spinal Cord. By H. E. Santee, M.D.	4th	1908	,, ,,
Radiumtherapy. By Wickham and Degrais. Translated by S. E. Dore, M.A.		1910	,, ,,
Tracheo-bronchoscopy, Esophagoscopy, and Gastroscopy. By C. Jackson, M.D.		1907	,, ,,
Reports from the Laboratory of the Royal College of Physicians, Edinburgh. Edited by G. L. Gulland, M.D., and James Ritchie, M.D. Vol. xii		1913	Librarian, Royal College of Physicians, Edin.
Pathology of the Eye. By P. H. Adams		1912	Presented by Surg.-Gen. Sir A. F. Bradshaw, K.C.B., K.H.P.
Report of the Anti-Typhoid Committee, 1912 ..		1913	Commandant's Office.

BALANCE SHEET.

LIABILITIES.	£	s.	d.
To Publishers' Bills for June Quarter, 1913	391	12	4
,, Balance Credit	2,377	8	4
	£2,769	0	8

ASSETS.	£	s.	d.	£	s.	d.
By Cash at Bank				305	15	10
,, Value Stamps in Hand				0	11	6
,, Investments at Cost—						
India Stock..	£979	8	0			
Consols	1,198	4	9			
Tasmanian 4 %, purchased Feb. 15, 1913	197	15	0			
				2,375	7	9
,, Furniture, &c., as per last Balance Sheet	26	11	3			
,, Written off for depreciation.. ..	2	13	2			
				23	18	1
,, Outstanding for Subscriptions				2	0	0
,, Do. Reprints				1	0	0
,, Do. Advertisements				60	7	6
				£2,769	0	8

TRADING ACCOUNT.

From July 1, 1912, to June 30, 1913.

Expenditure.

	£ s. d.
To Publishers' Bills—	
Journals	1,173 5 6
Corps News	197 5 2
Distribution List	35 12 9
Seniority Roll	21 13 9
Reprints	27 6 9
Envelopes, Postages and Packing..	94 2 3
Sundries	12 7 9
Balance to Profit and Loss Account	238 4 6
	£1,799 18 5

Receipts.

		£ s. d.	£ s. d.
By Subscriptions to Journal		1,205 3 0	
,, ,, Outstanding June 30, 1913		2 0 0	
		1,207 3 0	
Deduct Subscriptions credited in error ..	£5 0 0		
Deduct Subscriptions outstanding June 30, 1912	5 0 0		
		10 0 0	
			1,197 3 0
By Subscriptions to Corps News			33 18 10
,, ,, Seniority Roll			31 13 3
,, Receipts for Covers and Binding			0 3 0
,, ,, ,, Reprints		11 9 7	
,, Amount Outstanding for Reprints June 30, 1913		1 0 0	
		12 9 7	
Less Amount outstanding for Reprints June 30, 1912		0 16 0	
			11 13 7
By Advertisements			218 10 0
,, Sales through Manager			8 9 3
,, ,, ,, Publishers			298 7 6
			£1,799 18 5

PROFIT AND LOSS ACCOUNT.

From July 1, 1912, to June 30, 1913.

Expenditure.

	£ s. d.	£ s. d.
To Business Manager's Account—		
Postages	15 15 9½	
Clerk to Manager	24 0 0	
,, Editor	12 12 0	
Postman	1 0 0	
Stationery	2 8 11	
Refunds, &c.	0 13 9½	
		56 10 6
To Honorarium to Editor		100 0 0
,, ,, Assistant Editor		50 0 0
,, ,, Clerk in Record Office		6 10 0
,, ,, Auditor		2 2 0
,, Exchange on Drafts		0 1 9
,, Mr. Wale		1 0 0
,, Written off for Depreciation of Furniture, &c.		2 13 2
,, Balance carried to Balance Sheet—		
Net Profit during the year	87 12 7	
Balance, July 1, 1912	2,289 15 9	
		2,377 8 4
		£2,596 5 9

Receipts.

	£ s. d.
By Balance from last Account	2,289 15 9
,, Gross Profit on Trading Account	238 4 6
,, Interest on India Stock	32 19 2
,, ,, Consols	35 6 4
	£2,596 5 9

B. H. SCOTT, *Lieutenant-Colonel, R.A.M.C.*
Hon. Manager, Journal R.A.M.C.

July 8, 1913.

Examined and found correct,
EDMOND T. GANN.

ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE, IN ROOM 219, ON WEDNESDAY, JULY 23, 1913.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., President, in the Chair.
Surgeon-General W. Babtie, V.C., C.B., C.M.G.
Surgeon-General W. Donovan, C.B.
Sir James McGrigor, Bart.
Colonel W. H. Horrocks.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major E. M. Pilcher, D.S.O.

Letters of regret for non-attendance were read from Colonels J. Lane-Notter and H. L. Lynden-Bell.

(1) The minutes of the last meeting were read and confirmed.

(2) A grant of £20 was made to the orphan daughter of the late Deputy Surgeon-General W. H.

(3) A grant of £10 was made to the orphan daughter of the late Major B.

(4) It was decided that 250 copies of the revised Rules shall be printed and circulated to the present subscribers. It was further decided that the Secretary shall ascertain the cost of printing 1,500 copies of the revised Rules, and of distributing a copy to every officer of the Corps, and shall report the same at next meeting.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

July 24, 1913.

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, JULY 23, 1913.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, Army Medical Service, Chairman, in the Chair.
Surgeon-General W. Babtie, V.C., C.B., C.M.G.
Surgeon-General W. Donovan, C.B.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel W. W. Pope.
Major E. M. Pilcher, D.S.O.
Captain L. Cotterill.
Captain T. J. Wright.
Captain F. Crookes.

A letter of apology for non-attendance was read from Colonel H. L. Lynden-Bell.

(1) The minutes of the last meeting were read and confirmed.

(2) It was noted that the following grants were received for the General Relief Fund during the quarter ending June 30, 1913:—

Army Temperance Association, Aldershot	£20
No. 30 Company, Malta	10
	£30

(3) The sum of £52 was sanctioned for grants made from the General Relief Fund during the past quarter. A list of recipients is appended to these proceedings.

(4) The Aldershot Band Accounts were considered and passed, and are appended hereto. A grant of £110 was made from the Fund towards the current quarter's expenses.

(5) With reference to Minute 1 of the last Committee Meeting it was decided that the replies received by the Secretary should be referred to the Memorial Sub-Committee for consideration and report.

(6) With reference to Minute 9 of the last meeting, the following report of the Memorial Sub-Committee was read and adopted:—

"The Memorial Sub-Committee beg to report that in their opinion it would be inadvisable to define or limit the expression 'distinguished officer,' and recommend

that each case should continue to be brought before the Memorial Sub-Committee and judged on its merits."

(7) An application was read from Major Hartigan, asking for a grant of £7 to provide a tombstone for a private, late of the Royal Army Medical Corps at Tientsin. It was, after due consideration, decided to refuse the application, as similar applications have been previously refused.

(8) A sum of £1 5s. 10d. was sanctioned for money expended towards a wreath, &c., for the late Mother Mary Stanislaus.

(9) The Committee then considered the best method for allocating the votes for admission to the Royal School for Officers' Daughters, Bath, which will henceforth be available. It was resolved that the allocation of votes shall be left to a sub-committee consisting of the Director-General, Deputy Director Medical Services, London District, and Lieutenant-Colonel E. M. Wilson, the latter representing retired officers.

(10) It was noted that a sum of £261 7s. 6d. has been paid from the Fund towards the expenses of this year's dinner.

(11) It was resolved that Lieutenant-Colonel W. B. Day be elected a member of the Committee, representing retired officers, vice Lieutenant-Colonel H. E. R. James, whose tenure of appointment has ceased.

(12) It was resolved that Lieutenant-Colonel O. R. Julian, C.M.G., be appointed auditor, vice Colonel Simpson.

F. W. H. Davie Harris, *Lieutenant-Colonel, Secretary.*

124, *Victoria Street, S.W.*
July 24, 1913.

List of Recipients of General Relief for the Quarter ending June 30, 1913.

Name	Age	District	Grant	Total	Remarks
Mr. P. L.	63	Cork	£4	£4	In debt owing to wife's illness.
Mrs. W. G.	39	Colchester	3	11	Insufficient means; husband in Asylum.
Mrs. B. A.	28	,,	3	3	Destitution.
Mrs. W.	42	Aldershot	4	21	Special Grant by the Committee.
Hilda McD.	13	Portsmouth	4	12	Case before the Committee.
Mrs. L. E. W.	—	London	2	2	Destitution; deserted by husband.
Mrs. M. H. B.	30	Netley	3	3	Destitution; five children to support.
Mr. T. J.	52	Aldershot	4	4	Ill-health; unable to work.
Mr. F. W. W.	31	Woolwich	3	3	Destitution and ill-health.
Mrs. T. McE.	57	Dublin	2	5	Destitution.
Mrs. H.	41	Devonport	3	9	Out of work; two children to support.
Mr. A. P.	50	London	2	2	In debt from destitution.
Mr. G. R.	55	Aldershot	3	3	Destitution from ill-health.
Mrs. A. H.	69	Cork	3	3	Old age and poverty.
Mrs. V. M. B.	32	Aldershot	4	4	Destitute; four children.
Mrs. B. A.	34	Portsmouth	2	2	Destitute.
Mrs. L. E. W. L.	35	Woolwich	3	3	Unable to work from ill-health.
			£52		

ROYAL ARMY MEDICAL CORPS CENTRAL MESS FUND AND GAMES COMMITTEE.

The following officers have been nominated as representatives of their respective Commands and Districts on the above Committee:—

Scottish Command.—Major A. L. A. Webb.
Northern Command.—Captain T. E. Harty.
Western Command.—Major C. D. Myles.
Colchester District.—Captain G. R. Painton.

THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

FOR THE QUARTER ENDING JUNE 30, 1913.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
By Officers' (Aldershot) Subscriptions	18	5	0	To Debit at Bank, April 1	5	11	6
,, R.A.M.C. Fund, Quarterly Grant	120	0	0	,, Bandmaster's Salary	30	0	0
,, 34 Officers' Subscriptions at 5s.	8	10	0	,, Band pay	54	3	1
,, Refund from Petty Cash	5	0	0	,, Hawkes and Son (new trombone, music, &c.)	29	4	4
				,, Boosey and Co. (new cornet, repairs, &c.)	9	4	6
				,, French and Co. (music)	1	0	2
				,, Purchase of French Horn and Case	3	10	0
				,, Master Tailor	3	10	10
				,, Fees and Expenses of two Artists, Concert	6	18	6
				,, Phœnix Assurance Co.	2	2	9
				,, Huntley (Bandmaster's Boots)	2	14	9
				,, Gale and Polden (Stationery)	1	4	6
				,, Electric Light	0	15	4
,, Debit at Bank, July	12	8	5	,, Postage	0	9	11
				,, Petty Cash	13	13	3
	£164	3	5		£164	3	5

Audited and found correct (*Signed*) J. W. H. HOUGHTON, *Major R.A.M.C., President*
L. V. THURSTON, *Captain R.A.M.C.* } *Members.*
FRANK L. MOORE, *Lieutenant R.A.M.C., S.R.* }

Aldershot,
July 22, 1913.

Dover District.—Major T. C. Mackenzie, D.S.O.
Plymouth District.—Major T. E. Fielding.
Salisbury Plain District.—Captain S. M. W. Meadows.
Cork District.—Major C. B. Martin.
Belfast District.—Major S. B. Smith.
The names of representatives of messes abroad have not yet been received.

Of the 800 officers of the Corps who have, so far, expressed their willingness to subscribe to this Fund, some 200 have not yet sent their banker's orders to Messrs. Holt and Co.

ATHLETICS.

Association Football.—The Aldershot team had a very successful season which might have been even more so had not the Corps suffered from lack of sufficiently good reserves to fall back upon when the regular players were injured. The team was second in the Aldershot Senior League, reached the final round in the Aldershot Senior Cup and also in the Charity Cup, and the semi-final in the Hants Senior Cup. In the Army Cup the fifth round was reached.

In the Aldershot six-a-side competition the Corps won the Cup, scoring an average of five goals in each match; a record which has hitherto been unequalled in this competition.

The Cup open to boys of the Army was won by the R.A.M.C. boys, so there should be good hope for the future.

As to individuals, Corporal Prince and Private Quelch played for the Army *v.* Navy at Chatham, and also for the Army in England *v.* Army in Ireland, in which latter match Private Gillham also played.

Quartermaster-Serjeant Williams, R.A.M.C., Hon. Sec. of the Cup Team, was selected to take charge of the Army Team.

Lawn Tennis.—In the Army Championship Tournament at Queen's Club, the Corps was represented in the Inter-regimental Doubles by pairs from the following stations:—

Aldershot.—Lieutenants J. L. Ritchie and W. T. Christie.
Chatham.—Major Humphreys and Captain H. T. Wilson.
Dublin.—Captains C. H. Turner and F. Forrest.
London.—Major G. B. Crisp and Captain M. Sinclair.

Several of these pairs had had little chance of practice together, which it is hoped may be remedied another year.

In the Singles Championship, Lieutenant J. L. Ritchie reached the semi-final round. Several of the above also entered for this event, as well as Majors Stanistreet and Henderson.

Army Championship Meeting.—The Corps has every reason to congratulate its representatives on the brilliant manner in which they upheld its credit at this meeting.

Corporal H. M. Prince won the Half Mile Championship in the record Army time of 2 min. 1 sec. He was also second in the Quarter Mile (N.C.Os. and men).

Private C. Morris (Depot) was first in the 120 yd. Hurdles (N.C.Os. and men).

Private J. Stanton (No. 11 Company) was third in the Three Miles Championship.

3rd Grenadier Guards.—At the Athletic Meeting of the 3rd Battalion Grenadier Guards the Relay Race (three 220 yd. and one 440 yd.), open to the Aldershot Command, was won by the Corps team (Corporals Prince, Jepp, Hazell, and Private Morris) in 2 min. 10 sec. Eleven teams entered.

J. T. CLAPHAM, *Captain*,
Hon. Secretary.

20, *Belgrave Road*, *S.W.*
July 20, 1913.

DIPLOMA IN OPHTHALMOLOGY, OXFORD UNIVERSITY.

PRELIMINARY ANNOUNCEMENT.

THE classes for the next examination for the Diploma in Ophthalmology at the above University will begin in April, 1914. For particulars, apply to P. H. Adams, Margaret Ogilvie's Reader in Ophthalmology, 53, Broad Street, Oxford.

BIRTHS.

EVANS.—On July 3, at Malta, the wife of Major C. R. Evans, of a son.

CANE.—On July 19, at Kirkee, near Poona, India, the wife of Captain Arthur S. Cane, R.A.M.C., of a son.

BURNEY.—On June 28, 1913, at Khanspur, India, the wife of Captain W. H. S. Burney, R.A.M.C., of a daughter.

MARRIAGE.

POWELL—BARRASS.—On July 2, at St. Peter's, Harrogate, by the Rev. A. S. L. Broad, Major John Powell, R.A.M.C. (Egyptian Army), eldest son of the late John Clarke Powell, Blackrock, Co. Dublin, Ireland, and Mrs. Powell, Tentore, Bexhill, Sussex, to Elsie, eldest daughter of the late Matthew Barrass, Killingworth, Northumberland.

DEATH.

RIVERS.—On July 18, at Fleet, Hants, Major John Herbert Rivers, retired, Royal Army Medical Corps. He entered the service as a Surgeon-Lieutenant, Army Medical Service, January 30, 1893, became Surgeon-Captain January 30, 1896. He was seconded for service with the Egyptian Army, January 17, 1899, to July 29, 1904, and became Major, July 30, 1904. He retired on retired pay February 25, 1911. His war service was: Soudan, 1905, operations against the Nyam Nyam Tribes in the Bahr-el-Ghazal Province.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, *Serle Street, London, W.C., not later than the* 22*nd of the month.*

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	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3				
	8	0 5 6	0 2 6	4 0	1 3	3 6	0 9
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8				
	8	0 6 9	0 3 2	5 0	1 9	4 0	1 0
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9				
	8	0 9 0	0 4 4	6 6	3 3	5 6	2 0
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0				
	8	0 13 6	0 6 0	9 0	6 3	7 6	4 0
	16	1 3 6	0 8 9				

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major S. H. Fairrie, Captain J. B. Hanafin, Lieutenant-Colonel C. Birt, Captain J. A. Anderson, Dr. M. S. Pembrey, Captain N. Dunbar Walker, Captain W. F. M. Loughnan, Major J. G. McNaught, Major E. C. Freeman, Surgeon-General Sir David Bruce, Major W. S. Harrison, M.D., Surgeon-General G. J. H. Evatt, Major J. B. Anderson.

The following publications have been received:—

British: The St. Thomas's Hospital Gazette, Medical Press and Circular, The Proceedings of the Royal Society, The Practitioner, The Hospital, The Transvaal Medical Journal, Army and Navy Gazette, The Australasian Medical Gazette, The Royal Engineers' Journal, St. Bartholomew's Hospital Journal, Tropical Diseases Bulletin, The Lancet, The Journal of Vaccine Therapy, The Shield, The Army Review, Red Cross and Ambulance News, Transactions of the Society of Tropical Medicine and Hygiene, The Quarterly Journal of Medicine, The Medical Review, Guy's Hospital Gazette, The Army Service Corps Quarterly, Public Health, Journal of the Royal United Service Institution, Proceedings of the Royal Society of Medicine, The Journal of State Medicine, The British Journal of Tuberculosis, South African Medical Record, The Indian Medical Journal, The Army Service Corps Journal, Bedrock, The Journal of Tropical Medicine and Hygiene, The Liverpool Medico-Chirurgical Journal.

Foreign: Schmidt's Jahrbücher, Russian Military Medical Journal, United States Public Health Service, Bulletin de la Société de Pathologie Exotique, Revista de Sanidad Militar, Le Caducée, Archiv für Schiffs- und Tropen-Hygiene, Archives de Médecine et de Pharmacie Militaires, Deutsche Militärärztliche Zeitschrift, Archives de Médecine et Pharmacie Navales, Bulletin de l'Institut Pasteur, The Military Surgeon, Russian Naval Medical Journal, Bulletin of the Johns Hopkins Hospital, Tidskrift I Militär Hälsovard, American Medicine, Giornale di Medicina Militare.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

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THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

SEPTEMBER, 1913.

ESTABLISHMENTS.

Lieutenant-Colonel O. L. Robinson to be Professor of Tropical Medicine at the Royal Army Medical College, *vice* Major W. S. Harrison, dated August 22, 1913.

ARMY MEDICAL SERVICE.

Colonel Edmund J. E. Risk retires on retired pay, dated August 20, 1913. Colonel Risk entered the Service as a Surgeon, Army Medical Department, on July 30, 1881; became Surgeon-Major, Army Medical Staff, July 30, 1893; Lieutenant-Colonel, Royal Army Medical Corps, July 30, 1901; Lieutenant-Colonel with increased pay, August 14, 1907; Colonel, March 9, 1911, and was placed temporarily on the half-pay list on account of ill-health, March 27, 1913. His war service is: Egyptian Expedition, 1882. Action at Tel-el-Mahuta, capture of Mahsameh, and both actions at Kassassin. Medal; bronze star. South African War, 1902. Operations in the Transvaal, April to May 31, 1902. Queen's medal with two clasps.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Walter C. Beevor, C.M.G., M.B., retires on retired pay, dated August 20, 1913. Lieutenant-Colonel Beevor entered the Service as a Surgeon, Army Medical Department, on August 2, 1884; became Surgeon, Scots Guards, November 28, 1885; was specially promoted Surgeon-Major, Army Medical Staff, in recognition of his services during the expedition to Ashanti, March 25, 1896; became Surgeon-Major, Grenadier Guards, June 26, 1897; Surgeon-Major, Army Medical Staff, September 15, 1897; Surgeon-Major, Coldstream Guards, September 14, 1898; Surgeon-Major, Scots Guards, November 9, 1898; was seconded for service with the South African Constabulary from January 22, 1901, to May 2, 1902; became Surgeon-Major

Scots Guards, May 3, 1902; was seconded for service on the staff from May 28, 1903, to January 13, 1904; became Surgeon-Major, Scots Guards, January 14, 1904; Major, Royal Army Medical Corps, May 25, 1904; Lieutenant-Colonel, August 2, 1904; and Lieutenant-Colonel with increased pay, August 3, 1910. His war service is Soudan Expedition, 1885. Suakin. Medal with clasp; bronze star. Ashanti Expedition, 1895-96. Honourably mentioned; promoted Surgeon-Major. Star. Operations on N.W. Frontier of India, 1897; with Tirah Expeditionary Force. Despatches, *London Gazette*, April 5, 1898; medal with two clasps. South African War, 1899-1902. Advance on Kimberley, including actions at Belmont, Enslin, Modder River and Magersfontein. Operations in the Orange Free State, February to May, 1900; including actions at Poplar Grove, Dreifontein, Vet River (May 5 and 6), and Zand River. Operations in the Transvaal in May and June, 1900, including actions near Johannesburg, Pretoria and Diamond Hill (June 11 and 12). Operations in the Transvaal, east of Pretoria, July to November 29, 1900, including actions at Belfast (August 26 and 27). Operations in the Transvaal, Orange River Colony and Cape Colony, November 30, 1900, to March, 1902. Despatches, *London Gazette*, September 10, 1901. Queen's medal with six clasps; King's medal with two clasps; C.M.G.

Brevet Lieutenant-Colonel Thomas W. Gibbard, M.B., to be Lieutenant-Colonel, *vice* W. C. Beevor, C.M.G., retired, dated August 20, 1913.

The undermentioned Majors are placed on retired pay, dated July 29, 1913: Charles C. Spencer, M.B., Ernest M. Williams. Major Spencer entered the Service as a Surgeon-Lieutenant, Army Medical Staff, July 29, 1893, became Surgeon-Captain, July 29, 1896, and Major, Royal Army Medical Corps, January 30, 1905. His war service is: Ashanti Expedition, 1895-6. Star. China, 1900. Medal. Major Williams entered the service as a Surgeon-Lieutenant, Army Medical Staff, July 29, 1893, became Surgeon-Captain, July 29, 1896, and Major, Royal Army Medical Corps, April 29, 1905.

Captain John C. Hart, M.B., retires on retired pay, dated August 20, 1913. Captain Hart entered the Service as a Lieutenant, Royal Army Medical Corps, on January 28, 1907, and became Captain on July 28, 1910.

The undermentioned Lieutenants to be Captains, dated July 28, 1913: John Gilmour, M.B., Wilfred W. Treves, M.B., John T. Simson, M.B., Campbell Robb, M.B., Eric T. Gaunt, M.B.

Lieutenant Noel T. Whitehead, from the seconded list, is restored to the establishment, dated July 26, 1913.

The undermentioned Lieutenants are confirmed in their rank: Walter W. Pratt, M.B., Cuthbert J. H. Little, M.B., Edward P. A. Smith, M.B., James B. A. Wigmore, Charles C. Jones, M.B., Arthur A. M. Davies, Leslie Dunbar, M.B., Henry Beddingfield, M.B., Frederick C. Davidson, M.B., John F. O'Connell, M.B., Stanley D. Large, Cyril Helm, William O. W. Ball, M.B., John Crocket, M.B., Humfrey N. Sealy, Albert Jackson, Edward C. Beddows, Conyngham V. Thornton, M.B., John Rowe, M.B., William P. Croker, M.B., Arthur H. Bridges, Aubrey G. Brown, M.B., Robert Hemphill, M.B.

The undermentioned to be Lieutenants (on probation), dated July 25, 1913: Ernest Wentworth Wade, M.B., Bernard Woodhouse, William Kenneth Morrison, M.B., Edgar Percival, M.B., Henry Charles Deans Rankin, M.B.

The undermentioned Lieutenants are seconded under the provisions of Article 300, Royal Warrant for Pay and Promotion, dated July 25, 1913: Ernest W. Wade, M.B., Bernard Woodhouse, William K. Morrison, Edgar Percival, M.B.

Quartermaster and Honorary Major Alexander Bruce is placed on retired pay, dated August 4, 1913.

Serjeant-Major Frederick Edward Collard to be Quartermaster with the honorary rank of Lieutenant, *vice* Honorary Major A. Bruce, dated August 6, 1913.

HIGHER RATE OF PAY.—Lieutenant-Colonel J. J. Gerrard has been selected for the increased pay under Article 317, Royal Warrant for Pay and Promotion.

ARRIVAL HOME FOR DUTY.—Captain C. R. Millar, from West Africa, on July 23; Lieutenant-Colonel O. L. Robinson, from India, on July 28; Quartermaster and Honorary Captain F. W. Hall, from South Africa, on August 19.

ARRIVALS HOME ON LEAVE.—Colonel A. E. Tate, Lieutenant-Colonel H. A. Bray, Majors H. W. K. Read, C. R. Evans, G. J. Houghton, R. N. Hunt, R. C. Wilson and S. M. Adye-Curran, Captains A. G. Cummins, A. Shepherd, H. H. Leeson, W. G. Wright, C. M. Nicol and J. T. Simson.

POSTINGS.—To the Royal Army Medical College: Lieutenant-Colonel O. L. Robinson. To the Irish Command: Major N. J. C. Rutherford. To the Aldershot Command: Captain G. H. Stack. To the Eastern Command: Majors B. B. Burke and G. Baillie. To the Western Command: Captain H. B. Connell. To Netley: Quartermaster and Honorary Captain F. W. Hall.

APPOINTMENTS.—Captain E. L. Moss, charge of the Military Families Hospital, Portsmouth.

RETIRED PAY APPOINTMENTS.—The appointments at Penally and St. Peters, Jersey, are not now vacant.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names: Captain G. A. Kempthorne, the Diploma in Public Health of the Royal College of Physicians, London, and Royal College of Surgeons, England; Captain W. B. Purdon and Lieutenant W. Stevenson, the Diploma in Public Health of the Queen's University, Belfast. Lieutenant C. M. Finny, the Diploma in Public Health of the University of Dublin.

EMBARKATION.—For Malta: on August 9, Captain P. J. Marett.

ROSTER FOR SERVICE ABROAD.—Major R. McK. Skinner and Captains C. E. W. S. Fawcett and M. Keane, have exchanged to higher positions on the roster with Major C. B. Lawson and Captains S. L. Pallant and R. L. V. Foster respectively.

The exchange of destinations in India, and dates of sailing, between Lieutenants H. S. Blackmore and H. W. L. Allott has been approved.

RESULTS OF EXAMINATIONS.—The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part 1: Majors P. MacKessack and H. Herrick. In Appendix xiv, K.R., Part 1, Subject 1: Major L. Addams-Williams. In Appendix xiv, K.R., Part 1, Subject 2: Majors M. Boyle and H. Hewetson.

In Appendix xiv, K.R., Part 2: Major St. J. B. Killery.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Part 1, Subhead (*b*): Captains A. L. Otway, P. Dwyer, P. Power, R. S. Smyth, A. S. Littlejohns, W. Egan, E. M. O'Neill, A. H. Bond and A. H. Jacob.

In Appendix xi, K.R., Subhead (*d*) ii: Major E. W. Powell.

In Appendix xi, K.R., Subheads (*d*) ii and (*d*) iii: Majors J. W. H. Houghton, L. Humphry, and H. Ensor, D.S.O., Captains A. B. Smallman, G. H. J. Browne, N. E. Dunkerton, A. L. Otway, J. St. A. Maughan, C. G. Browne, R. S. Smyth, W. K. Beaman and H. G. Gibson.

In Appendix xi, K.R., Subhead (*d*) iii: Majors M. Boyle, P. J. Probyn, D.S.O., H. Hewetson, L. Addams-Williams, P. MacKessack, A. L. Scott, J. W. Leake, J. Chopping, A. O. B. Wroughton, V. J. Crawford, E. P. Sewell, C. R. Evans, H. H. Norman, H. S. Anderson, W. M. H. Spiller, A. R. Greenwood, W. L. Steele, C. H. Carr, and R. V. Cowey, Captains J. G. Bell, M. F. Grant, M. D. Ahern, J. B. Grogan and W. H. Forsyth.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (*c*) ii: Lieutenants C. M. Finny and D. Reynolds.

In Appendix xi, K.R., Subhead (*d*) ii: Lieutenants D. W. Bruce, L. Buckley and A. S. Heale.

In Appendix xi, K.R., Subhead (*d*) iii: Lieutenant H. J. G. Wells.

In Appendix xi, K.R., Subheads (*d*) ii and (*d*) iii: Lieutenant H. R. L'Estrange.

In Appendix xi, K.R., Subheads (*d*) ii, (*d*) iii and (*h*): Lieutenants G. O. Chambers, B. Biggar, T. C. R. Archer, W. B. Laird, H. S. Blackmore, F. R. B. Skrimshire, T. E. Osmond, W. L. Webster, E. B. Allnutt, H. C. Todd, E. C. Deane, W. Stewart, R. K. Mallam, W. McNaughton, C. J. Blaikie, J. H. M. Frobisher, J. L. Ritchie and P. A. With.

In Appendix xi, K.R., Subheads (*d*) iii and (*h*): Lieutenant B. T. Vivian.

In Appendix xi, K.R., Subhead (*h*): Lieutenant I. R. Hudleston.

ROYAL ARMY MEDICAL CORPS.

The undermentioned officers are reported as having passed in Subject (*h*), Captains, Royal Army Medical Corps, for promotion to the rank of Major, held at the Royal Army Medical College, during the class of instruction for Captains terminated on July 28, 1913.

Rank and Name	Class	Eligible for acceleration of promotion	Selected subject	Remarks
Hughes, G. W. G. ...	3rd	3 months	Ophthalmology	Specialist.
Powell, J. E.	,,	3 ,,	Dermatology, &c. ...	,,
Ievers, O.	2nd	6 ,,	Midwifery, &c.	,,
Wetherell, M. C. ...	...	...	State Medicine	...
Meaden, A. A.	3rd	3 months	Midwifery, &c.	...
Campbell, J. H.	,,	3 ,,	Bacteriology	...
Sidgwick, H. C.	2nd	6 ,,	Operative Surgery ...	Specialist.
Low, N.	3rd	3 ,,	State Medicine	,,
Cordner, R. H. L. ...	,,	3 ,,	Physical Training ...	,,
Beadnell, H. O. M. ...	,,	3 ,,	Bacteriology	...
Coppinger, C. J.	2nd	6 ,,	,, ...	Specialist.
Meredith, R. G.	3rd	3 ,,	Dermatology, &c. ...	...
Roberts, F. E.	,,	3 ,,	State Medicine	Specialist.
Gibbon, T. H.	2nd	6 ,,	Bacteriology	,,
Hoar, J. E.	3rd	3 ,,	Dermatology, &c. ..	,,
O'Brien, C. W.	...	...	Ophthalmology	...
Tabuteau, G. G.	3rd	3 months	Operative Surgery ...	Specialist.
Rahilly, J. M. B. ...	,,	3 ,,	,, ,, ...	,,
Humfrey, R. E.	,,	3 ,,	State Medicine	,,
Maydon, W. G.	...	...	Physical Training, &c....	...
Ormrod, G.	3rd	3 months	Ophthalmology	Specialist.
Sherren, H. G.	...	...	Operative Surgery ...	...
Lewis, R. P.	...	...	Physical Training, &c.	Specialist.
Graham, J. H.	...	...	State Medicine	...
Ferguson, G. E.... ...	...	...	Operative Surgery ...	Specialist.
Fawcett, C. E. W. S. ...	...	...	Midwifery, &c.	...
Scatchard, T.	..	...	Dermatology, &c. ...	Specialist.
Symons, V. H.	...	...	State Medicine	...
Bryden, R. A.	...	...	Operative Surgery ...	...
Moss, E. L.	...	...	Midwifery, &c.	Specialist.
Cromie, M. J.	...	...	Dermatology, &c. ...	...
Potts, E. T.	...	...	Midwifery, &c.	...
Ware, G. W. W.... ...	...	...	Dermatology, &c. ..	...
Nimmo, W. C.	...	...	Midwifery, &c.	Specialist.
Keane, M.	...	...	State Medicine	...
White, C. F.	...	...	Dermatology, &c. ...	Specialist.
Sampson, F. C.	...	...	,, ,, ...	,,
Blackwell, T. S.	...	...	State Medicine	,,
Marett, P. J.	...	...	Bacteriology, &c. ...	,,
O'Carroll, A. D.	...	...	Physical Training, &c.	,,
Edwards, G. B.	...	...	Bacteriology	...
Leslie, T. C. C.	...	...	State Medicine	...
Bell, W. J. E.	...	...	,, ,, ...	...
Fraser, A. D.	...	...	Bacteriology	Specialist.
Perry, H. M. J.	1st	12 months	,, ...	,,
Andrews, L. A. A. ...	...	...	Dermatology, &c. ...	,,
Carruthers, V. T. ...	...	...	Operative Surgery ...	...

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS AND MEN.

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Quartermaster-Serjeants.

No.	Rank	Name	Date	Section	Remarks
11419	Staff-Serjt.	McClelland, J.H.	4.4.13	..	*Vice* W. N. Speedy, to pension.
10953	,, ,,	Way, W. A. ..	13.6.13	..	,, F. L. M. Jones, to pension.
10922	,, ,,	Robinson, H. ..	21.6.13	..	,, G. Arnold, to pension.
		To be Staff-Serjeants.			
12391	Serjeant ..	Ogden, H.	16.6.13	..	*Vice* J. H. Smith, to pension.
18439	,, ..	Leach, W. T. ..	16.6.13	..	,, H. Ogden, Supernumerary, with Colonial Government.
12285	,, ..	Burton, C. A. ..	21.6.13	..	,, H. Robinson, promoted.
		To be Corporals.			
4882	Lce.-Corpl.	Summers, F. G.	1.7.13	Nursing ..	To complete Establishment.
14452	,, ..	Godfrey, F. ..	1.7.13	Clerical ..	To complete Establishment.
15835	,, ..	Beavis, W. ..	1.7.13	Nursing ..	To complete Establishment.
17123	,, ..	Sawyer, W. H.	1.7.13	,, ..	To complete Establishment.
17208	,, ..	Bailey, J. ..	1.7.13	Q.A.I.M.N.S.	To complete Establishment.
17401	,, ..	Wright, H. J. ..	1.7.13	Nursing ..	To complete Establishment.
18289	,, ..	Tweed, L. ..	1.7.13	Cooking ..	To complete Establishment.
18379	,, ..	White, A. ..	1.7.13	,, ..	To complete Establishment.
18675	,, ..	Partridge, A. C.	1.7.13	,, ..	To complete Establishment.

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified :—

To be Lance-Corporals.

No.	Rank	Name	Date	Section	Remarks
73*	Private ..	Ellard, F. ..	5.5.13	Nursing ..	To complete Establishment.
1051*	,, ..	Davey, W. H. ..	8.5.13	,, ..	To complete Establishment.
1974*	,, ..	Ferguson, C. D.	24.5.13	,, ,,	To complete Establishment.
1919*	,, ..	Vyse, F. H. ..	16.6.13	,, ,,	To complete Establishment.
911*	,, ..	Clough, W. ..	1.7.13	General Duty	To complete Establishment.
1302*	,, ..	Jack, J. ..	1.7.13	Nursing ..	To complete Establishment.
1344*	,, ..	Shelley, W. C.	1.7.13	,, ..	To complete Establishment.
1475*	,, ..	Bamford, W. J.	1.7.13	,, ..	To complete Establishment.
2106*	,, ..	Macdonald, J.	1.7.13	,, ..	To complete Establishment.
11848	,, ..	East, A. ..	1.7.13	,, ..	To complete Establishment.
12096	,, ..	Flynn, W. ..	1.7.13	General Duty	To complete Establishment.
19594	,, ..	Holden, P. W.	1.7.13	,, ,,	To complete Establishment.
19917	,, ..	Cate, A. ..	1.7.13	,, ,,	To complete Establishment.

* Special under para. 281, Standing Orders.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The undermentioned Non-Commissioned Officers have been selected for admission into Q.A.I.M.N.S., with increased pay at 6*d.* a day, from the date specified :—

No.	Rank and Name		Date	Station
19032	Corporal ..	Cooke, J.	19.2.13	Aldershot.
19070	,, ..	Siddall, H.	11.4.13	Chester.

AWARD OF ARMY FORM C 344.

The undermentioned have been awarded A.F. C 344, on the completion of three years' training, on the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
12756	Serjt.	Jones, F. H. ..	30.9.06	2218	Pte. ..	Snape, G. ..	7.4.13
18061	Corpl.	Cairns, W. ..	3.8.07	12815	Serjt.	Burgess, G. ..	7.4.13
19543	,, ..	Audus, F. E. H.	27.5.08	1847	Corpl.	Ogg, R. W. ..	2.5.13
17681	Pte. ..	Hooper, W. J.	8.7.08	1478	Pte. ..	Cheater, H. C.	16.5.13
12413	Serjt.	Russell, E. J...	2.11.08	1490	,, ..	Lansdowne, E.W.	16.5.13
14569	,, ..	Littleworth, F.	9.12.09	18634	Serjt.	Galton, F. H...	29.5.13
728	Pte. ..	Brooks, A. T. ..	4.4.13	4890	Pte. ..	Tumilty, J. ..	16.6.13
18110	Serjt.	Gibson, R. W...	5.4.13				

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
2032	Pte. ..	Wood, R. R. ..	20.1.13	*19468	L.-Cpl.	Jack, G. D. ..	13.5.13
6954	,, ..	Fallaize, W. E.	15.2.13	6230	Pte. ..	Manley, J. ..	16.5.13
18170	Serjt.	Sufrin, L. ..	7.3.13	1855	,, ..	Crowe, F. J. A.	21.5.13
7066	Pte. ..	McCarthy, F. B.	20.3.13	5939	,, ..	Green, W. J. ..	22.5.13
6536	,, ..	Cuffe, W. ..	7.4.13	*16678	Serjt.	March, J. E. ..	24.5.13
6612	,, ..	Young, G. ..	7.4.13	6474	Pte. ..	Bishop, E. C. ..	29.5.13
4939	,, ..	Hunter, F.N.E.S.	14.4.13	1861	,, ..	Simmons, J.C.R.	29.5.13
5955	,, ..	Dolan, W. ..	14.4.13	5937	,, ..	Withers, F. A.	29.5.13
6352	,, ..	Whiting, F. C.	14.4.13	6099	,, ..	Corcoran, J. A.	29.5.13
5652	,, ..	Taylor, R. ..	17.4.13	6320	,, ..	Clark, N. J. ..	29.5.13
6215	,, ..	Goodchild, C. ..	17.4.13	6461	,, ..	Chapman, G. W.	29.5.13
6469	,, ..	Row, R. ..	17.4.13	6487	,, ..	Bulpitt, P. C...	29.5.13
6647	,, ..	Simmons, J. F.	17.4.13	6518	,, ..	Smith, T. G. ..	29.5.13
6649	,, ..	Alcock, H. ..	17.4.13	6617	,, ..	Goodwin, R. A.	29.5.13
6534	,, ..	Catherine, R. W.	21.4.13	16917	Serjt.	Fish, A. ..	9.6.13
6285	,, ..	Powell, E. ..	28.4.13	6485	Pte. ..	Barnfield, E. T.	9.6.13
6332	,, ..	Parker, G. H...	28.4.13	6678	,, ..	Hunt, L. E. ..	9.6.13
6594	,, ..	Simons, A. ..	2.5.13	6691	,, ..	Annette, J. ..	10.6.13
6564	,, ..	Wilson, A. ..	2.5.13	6431	,, ..	Rose, C. M. ..	11.6.13
6669	,, ..	Rose, G. H. ..	2.5.13	6284	,, ..	Harris, W. ..	24.6.13
7873	,, ..	Wallis, L. ..	2.5.13	6568	,, ..	Casey, L. ..	30.6.13

* Supernumerary.

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from July 1, 1913 :—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
1973	Elliott, W.	5106	Clarke, A. E.	5362	Grantham, A.
2030	Tucker, G. H.	5144	Smith, A.	5368	Bowden, R. J.
2039	Tomson, H.	5164	Dowding, A. J.	5371	Dunne, D.
4389	Dedow, P. F.	5200	Breeze, J. H.	5386	Gray, F. A.
4593	Martin, P. G.	5202	Roughley, J.	5390	Tait, D. C.
4841	Clarke, A. E.	5212	Herbert, F.	5425	Smith, W. F.
5034	Taprill, F.	5232	Drury, S. T.	5452	Griffiths, H.
5048	Suter, J. W. P.	5241	Hollier, F. C.	5467	Brown, H. A. W.
5072	Parsons, S. T.	5250	King, H. T.	5500	Butler, W.
5074	Lawson, P. L.	5316	Wall, W. G. H.	5535	Masters, C. H.
5082	Kelly, J.	5328	Maydon, F.	5567	Gilmour, T.
5104	Steer, H. J.	5330	Stretch, T. W.	5843	Fraser, J.

As Clerks.

19472	Munson, C. E.	5648	Smith, E. F.	5918	Blair, H.
26	Bax, F.	5808	Maxwell, M., M.D.	6231	Martin, P. J.
2299	Hall, E.	5906	Fagg, C.G.		

As Superintending Cooks.

14017	Adamson, T.	4541	Sims, J. R.	5614	Reynolds, G.

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

1363	Green, H.	5769	Rushmer, B. G.	6113	Foley, R.
2273	World, G. P.	5771	Fennell, F.	6115	Manchip, E. J.
4419	Crowther, F.	5796	Dixon, W. V.	6119	Whitelock, W. H.
5097	Woodfield, J. H.	5800	Hollier, F. J.	6152	Carroll, A.
5108	Westwood, C.	5811	Buckby, C. G.	6172	Myers, D.
5350	Morris, G.	5821	Boffin, C. J.	6192	Croasdale, F.
5361	Orr, R.	5846	Brownlie, W.	6213	Rose, H.
5400	Brinicombe, S. R.	5854	Newby, W.	6226	Bonnell, G. F.
5450	Tapp, W. J.	5866	Toms, F. H.	6233	Cox, T.
5482	Laird, A. G.	5881	Moth, J. C.	6235	Green, G. L.
5524	Owen, H.	5883	Bray, C.	6240	Dyer, H. J.
5533	Cheeseman, G.	5901	Johnson, J. E.	6241	Beeching, A. H.
5562	Caseley, A. C. J.	5905	Elliott, W.	6264	Marsh, J. E.
5566	Douce, T.	5910	McLeod, D.	6284	Harris, W.
5569	Seagust, W. F.	5928	Beckett, J.	6286	Davies, P. F.
5634	Burton, V. M.	5929	Langman, B. H.	6338	Neagle, J. I.
5649	Weller, E. C.	5981	Bunfield, W. C.	6362	Ballard, T. H.
5650	Harrott, F. W.	5982	Grey, W.	6369	Tappolet, E.
5691	Gallagher, G.	5989	Holmes, J.	6402	Walters, A. J.
5709	Hammond, E.	5995	Barsby, A. B.	6453	Sawyer, E. W.
5711	Chester, J.	6004	Brewer, T. A.	6504	Langlois, W.
5740	Jones, J. T. G.	6049	Herad, E. J.	6507	Robinson, F.
5751	Cowne, C. E. A.	6051	Richards, W.	6552	Craib, W.
5763	Littlemore, S. H.	6103	Allen, W. G.		
5766	Stacey, G. A.	6108	Houghton, A.		

As Clerks.

No.	Name	No.	Name	No.	Name
2192	Hayes, E. J. A. J.	6018	Pilgrim, A. J.	6356	Stevens, F. D.
5745	Jones, D.	6135	Munday, A. E.	6640	Underhill, T. G.
5935	Purser, R. H.	6162	Morris, H.		

As Cooks.

No.	Name	No.	Name	No.	Name
15902	Hammond, G.	5443	Perrin, P.	6074	Newberry, T. G.
132	Dart, S.	5695	Phillips, F.	6085	Cousins, G.
1082	McKeague, J.	5696	Hurd, F. G.	6092	Jones, J. A.
4677	Banger, M. E. M.	5838	Newington, H. G.	6160	Wilkinson, F. A.
5031	Aston, W.	5921	Gilder, S. G.	6357	Taylor, H. F.
5415	Homewood, H. R.	6007	Meadows, C. W.	6512	Moore, S. J.

SANITARY ORDERLIES.

The following Privates are advanced to the Fourth Rate of Corps Pay at 6*d*., as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
4893	Beverley, T.	19.10.12	5448	Doyle, D.	20.4.13
5469	Jordan, G. H... ..	1.1.13	5961	Willis, F.	21.4.13
6013	Nawer, W.	5.3.13	5676	Jacobs, A.	24.4.13
5904	Green, C. H.	6.3.13	5914	Pashley, G.	28.4.13
991	Betts, E. A.	30.3.13	1410	Pratt, J. R.	1.5.13
18978	Smith, W. J. A. ..	1.4.13	19993	Macaulay, W... ..	23.5.13
4763	Watson, E. R. ..	1.4.13	5752	King, R. G.	23.6.13
5100	Nicholas, W. T. G. ..	3.4.13			

BUGLERS.

The following boys are appointed Buglers from the dates specified :—

No.	Name	Date	No.	Name	Date
6559	Elmer, H. W. C. ..	8.4.13	6525	Hurley, F. W. T. ..	7.6.13

NON-EUROPEAN SECTION R.A.M.C.

Promotion.

The following promotion will take effect from the date specified :—

To be Corporal.

No. 7 (N.E.S.) Lance-Corporal Anglin, T.A., 5.4.13.

ADVANCEMENT OF PRIVATE (CORPS PAY).

The following advancement in rate of Corps Pay will take effect from July 1, 1913, inclusive :—

To be Advanced to the Fourth Rate (at 6d.).

As Cook.

No. 6 (N.E.S.) Nedd, C.

TRANSFERS TO ARMY RESERVE.

5035	Pte.	Given, H. J. ..	17.7.13	5047	Pte.	Hatcher, P. ..	31.7.13
19687	L.-Cpl.	Dellagana, A. C.	12.7.13	5057	,,	Carter, T. D. ..	5.8.13
443	Pte.	Guggenheim, E. J. J.	12.7.13	5054	,,	Winslow, A. H.	1.8.13
				5051	,,	Povey, F. J. ..	2.8.13
422	,,	Sevier, R. O. ..	13.7.13	5050	,,	Birtwistle, W...	3.8.13
431	,,	Halden, E. ..	16.7.13	5954	,,	Wootton, A. H.	4.8.13
5028	,,	Gooding, R. ..	13.7.13	795	,,	Hunt, H. H. ..	5.8.13
5034	,,	Taprill, F. ..	17.7.13	5049	,,	Kellett, A. ..	2.8.13
5042	,,	Bell, R. Y. ..	26.7.13	19731	,,	Clements, A. ..	9.8.13
4972	,,	Phillips, A. J. ..	20.7.13	5056	,,	Jones, W. ..	9.8.13
5043	,,	Sigrist, G. ..	27.7.13	5063	,,	Regan, J. ..	11.8.13
453	,,	Owen, T. R. ..	19.7.13	560	,,	Norris, F. J. ..	10.8.13
5039	,,	Edwards, A. E.	24.7.13				

DISCHARGES.

8111	Sjt.-Major	Eate, W. E. ..	20.8.13	After 25 years' qualifying service, &c.
8117	,,	Taylor, F. J. ..	20.8.13	After 25 years' qualifying service, &c.
7764	,,	Hew, G.	18.8.13	Having reached the age for discharge.
9742	S.-Serjt. ..	Heath, E.	29.7.13	Termination of second period.
9750	Serjeant ..	Leaf, F.	27.7.13	,, ,, ,,
9731	,, ..	Folkes, G. A. ..	27.7.13	,, ,, ,,
6859	,, ..	Walsh, J.	15.8.13	After 3 months' notice.
9760	Corporal ..	Howard, J.	9.8.13	Termination of second period.
18836	Private ..	Smith, J. E. ..	31.7.13	Medically unfit.
6238	,, ..	Butler, F.	7.8.13	,, ,,
4400	,, ..	Smith, F.	4.8.13	After 3 months' notice.

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Staff-Serjeant.

10076	Serjeant ..	Brown, W. H.			

For Serjeant.

18973	Lce.-Serjt.	Abbott, J. J.	17319	Corporal ..	Hort, A. T.
19193	Corporal ..	Stebbings, W. M.			

For Corporal.

2166	Private ..	Mathias, W. T.	1656	Private ..	Chivers, A. H.
4389	,, ..	Dedow, P. F.	4541	,, ..	Sims, J. R.
5413	,, ..	Wolsey, B.	5449	,, ..	Harris, C. W.
990	,, ..	Tasker, S. E.			

TRANSFERS TO OTHER CORPS.

5069	Private ..	Weeks, A. A. ..	30.6.13	To A. S. Corps.
17273	S.-Serjeant	Jones, W. H. ..	16.7.13	,, Colonial Government.

BUGLER.

2229	Bugler ..	Harris, H. P. ..	13.7.13	To ranks.

DEATHS.

6246	Pte.	Toghill, C. C. ..	28.7.13	Aldershot	Pneumonia.
5682	,,	Farrer, S. E. ..	4.8.13	York ..	Fracture of skull.

DISEMBARKATIONS FROM ABROAD.

From South Africa, June 18, 1913.

18391	Serjeant ..	Turner, E. C.			

From Sierra Leone, per s.s. "Sobo," July 23, 1913.

17633	Serjeant ..	Sproule, R.	17555	Serjeant ..	Kinder, M.
17319	Corporal ..	Hort, A. T.	19193	Corporal ..	Stebbings, W. M.

From Sierra Leone, per s.s. "Appam," July 27, 1913.

14924	Serjeant ..	Forbes, J. G.			

MEDICAL MANŒUVRES, 1913.

An Aldershot Command tactical exercise, arranged for the training of Royal Army Medical Corps units in combination with the fighting troops, was carried out from August 6 to 9, under the direction of Lieutenant-General Sir Douglas Haig, K.C.B., K.C.I.E., K.C.V.O.

On August 4 the R.A.M.C. personnel required to form the complete medical service of one division, one clearing hospital, one ambulance train, with officers to act as medical service umpires, assembled at Aldershot. The total strength amounted to 66 officers, 4 warrant officers, 49 staff-serjeants and serjeants, 10 buglers, and 642 rank and file.

On August 6 the 1st Division, augmented by one regiment of cavalry and with its medical units and regimental medical establishments at war strength, marched from Aldershot to Godalming and, on arrival there, represented the general advanced guard of a northern (Brown) force, moving south via Weybridge, Ripley, Guildford and Godalming on Midhurst against a southern (White) force which had concentrated in the Meon Valley and pushed forward a covering detachment to Petersfield.

On the evening of August 6 information reached Brown headquarters that the White detachment at Petersfield, estimated at from one to two infantry brigades with some cavalry and artillery attached, had marched that day for Thursley and the G.O.C. Brown general advanced guard was directed to advance on August 7 so as to defeat the White detachment and, having driven it westward, to occupy Hindhead on the night of August 7/8.

Railhead for the troops of the general advanced guard was considered to be at Woking.

The railway from Woking to Aldershot was considered to be the railway from railhead to the advanced base.

The clearing hospital, which moved on August 5 from Aldershot to Broadwater Park, one mile north of Godalming, was considered to be at Woking, and was not allowed to come into action until 2 p.m. on August 7, by which time it could have reached Broadwater Park, after being ordered forward from railhead in the ordinary course.

Operations began at 8 a.m. on August 7. Fighting was continuous. The Brown troops captured Thursley and when darkness set in bivouaced behind a line of outposts extending, roughly, from the eastern boundary of Elstead Common to Hindhead.

Picquets of the opposing forces were in contact during the night and soon after 5 a.m. on August 7 general hostilities were resumed. During the early hours of the morning a thick mist rendered movement difficult. Brown captured Kettlebury Hill, and about 11.30 a.m. when White had retreated to the western part of Frencham Common the operations of the fighting troops ceased.

The casualties, estimated as wounded, to be dealt with by the medical service, and represented by officers and other ranks of the Brown troops, who had wound tallies fixed on them by umpires during suitable phases of the fight, numbered 450 up to the evening of the 7th, and 280 on the 8th, total 730. Most of the walking cases, wounded on the 7th, reached the clearing hospital that evening, but as the motor lorries of the supply column did not start on the return journey from the refilling point until about 9.30 p.m., about 105 of the sitting and lying-down cases loaded on them at the field ambulance bivouacs were carried direct to Woking station, where they arrived at 12.10 a.m. on August 8. The off-loading of the lorries and loading of the ambulance train was admirably organized and carried out, and the train started for Aldershot at 12.40 a.m.

The ambulance train made a second journey to Aldershot on the afternoon of the 8th, carrying wounded who had been despatched by motor lorries via the clearing hospital. The train was made up of the ambulance coaches used to convey invalids to Netley and three goods vans fitted with various apparatus for supporting stretchers.

Buildings in the villages of Elstead, Milford, Witley and Brook were taken up for the exercise and utilized for dressing stations, &c.

Sir Spencer Ewart, Adjutant-General, Sir Launcelotte Gubbins, and Surgeon-General W. Babtie watched the operations on August 7 and 8.

The Directing Staff and troops taking part were as follows:—

Director:—Lieutenant-General Sir Douglas Haig, K.C.B., K.C.I.E., K.C.V.O.

Directing Staff:—Surgeon-General G. W. Robinson, C.B., D.D.M.S., Aldershot Command; Major-General F. J. Davies, C.B., General Staff; Colonel H. J. Du Cane, C.B., M.V.O., A.Q.M.G.; Lieutenant-Colonel C. H. Burtchaell, R.A.M.C., A.D.G.A.M.S.; Lieutenant-Colonel S. G. Moores, R.A.M.C., D.A.D.M.S., Aldershot Command: Lieutenant-Colonel R. H. K. Butler, General Staff; Major Travers Clarke, D.A.A.G.; Major A. J. Turner, General Staff.

BROWN FORCE:

1st Division.

Major-General S. H. Lomax	Commanding.
Lieutenant R. Giffard, Royal Artillery	A.D.C.
Colonel R. Fanshawe, D.S.O.	G.S.O., 1st Grade.
Major H. D. De Prée, Royal Artillery	D.A.A. & Q.M.G.
Captain C. P. Graham, 2nd Welsh Regt.	A.P.M.
Colonel T. P. Woodhouse, A.M.S.	A.D.M.S.
Major A. Chopping, M.B., R.A.M.C.	D.A.D.M.S.

Cavalry.

5th Dragoon Guards.—Lieutenant-Colonel G. K. Ansell.. Commanding.

1st Infantry Brigade.

Brigadier-General F. I. Maxse, C.V.O., C.B., D.S.O.	Commanding.
Major C. E. Corkran, Grenadier Guards	Brigade Major.

1st Grenadier Guards, 3rd Grenadier Guards, 1st Royal Highlanders, 2nd Royal Munster Fusiliers.

2nd Infantry Brigade.

Brigadier-General E. S. Bulfin, C.V.O., C.B. .. .. Commanding.
Major H. Wake, D.S.O., K.R.R. Corps .. .. .. Brigade Major.
2nd Yorkshire Regt., 2nd R. Sussex Regt., 1st L.N. Lancashire Regt., 2nd King's Royal Rifle Corps.

3rd Infantry Brigade.

Brigadier-General H. J. S. Landon, C.B. .. .. .. Commanding.
Captain J. B. Jenkinson, Rifle Brigade .. .. .. Brigade Major.
1st R.W. Surrey Regt., 1st Somerset L.I., 2nd Welsh Regt., 2nd Essex Regt.

Divisional Troops.

Divisional Mounted Troops.—Major F. C. Pilkington .. Commanding.
"A" Squadron 15th Hussars, "C" Squadron 15th Hussars.
Artillery.—Brigadier-General N. D. Findlay, C.B. .. Commanding.
,, Captain D. Stewart, R.A. .. .. .. Staff Captain.
12th (How.) Brigade, R.F.A.; 39th Brigade, R.F.A.; 14th Brigade, R.F.A.; 26th Brigade, R.F.A.; 26th (Heavy) Battery, R.G.A.
Engineers.—Lieutenant-Colonel A. L. Schreiber, D.S.O... Commanding.
,, —Captain L. C. Jackson, C.M.G., R.E. .. Adjutant.
23rd (Field) Company, R.E. 26th (Field) Company, R.E.
Army Signal Service.—1st Signal Company, R.E.
Divisional Train.—Captain F. J. Reid, A.S.C. .. .. Commanding.
36th Company, A.S.C. (Headquarters Coy.); 7th Company, A.S.C. (2nd Brigade); 16th Company, A.S.C. (1st Brigade); 13th Company, A.S.C. (3rd Brigade).
Royal Army Medical Corps:—

No. 1 *Field Ambulance.*—Majors L. A. Mitchell, E. W. W. Cochrane, A. R. Greenwood, Captains G. Ormrod, T. Scatchard, A. D. O'Carroll, and Captain R. R. Cowan (Quartermaster), Lieutenants G. A. Blake, R. W. Vint, J. B. A. Wigmore.

No. 2 *Field Ambulance.*—Lieutenant-Colonel C. A. Stone, Major E. C. Hayes, Captains H. W. Long, J. D. Richmond, A. W. Gater, E. L. Moss, W. Egan, C. R. M. Morris, Lieutenants H. F. Panton and R. H. Green (Quartermaster).

No. 3 *Field Ambulance.*—Lieutenant-Colonel F. R. Newland, Majors W. Tibbits, A. O. B. Wroughton, Captains T. E. Harty, V. G. Johnson, T. T. H. Robinson, A. E. G. Fraser, Lieutenants E. U. Russell, R. C. Carlyle, and J. Clarke (Quartermaster).

Attached to Regimental Units.

1*st Infantry Brigade.*—1st Grenadier Guards, Lieutenant W. O. W. Ball; 3rd Grenadier Guards, Lieutenant W. W. Pratt; 1st Royal Highlanders, Lieutenant J. L. Ritchie; 2nd Royal Munster Fusiliers, Captain C. McQueen.

2*nd Infantry Brigade.*—2nd Yorkshire Regiment, Lieutenant J. Rowe; 2nd Royal Sussex Regiment, Captain W. C. Nimmo; 1st L.N. Lancashire Regiment, Captain R. P. Lewis; 2nd King's Royal Rifle Corps, Lieutenant E. P. A. Smith.

3*rd Infantry Brigade.*—1st Royal West Surrey Regiment, Captain A. D. Fraser; 1st Somerset Light Infantry, Captain A. H. Bond; 2nd Welch Regiment, Lieutenant R. K. Mallam; 2nd Essex Regiment, Lieutenant L. Buckley.

Divisional Troops.—14th Brigade Royal Field Artillery, Lieutenant W. B. Stevenson; 26th Brigade Royal Field Artillery, Captain L. V. Thurston; 39th Brigade Royal Field Artillery, Lieutenant J. F. O'Connell; 12th (Howitzer) Brigade Royal Field Artillery, Lieutenant F. R. B. Skrimshire.

L. of C. Units.

Clearing Hospital.—Lieutenant-Colonel A. A. Sutton, D.S.O., Majors B. W. Longhurst, E. B. Knox, A. J. Hull, Captains A. H. Jacob, H. M. J. Perry, Lieutenants W. Stewart and T. D. Conway (Quartermaster).

Ambulance Train.—Major W. Riach, Captain A. M. Pollard.

UMPIRES FOR MEDICAL SERVICES.

Major M. H. G. Fell, D.A.D.G., A.M.S. .. .. Clearing Hospital.
Major T. H. J. C. Goodwin, D.S.O., R.A.M.C. .. No. 1 Field Ambulance.
Major H. Ensor, D.S.O., R.A.M.C. .. .. .. ,, 2 ,,
Major J. S. Gallie, R.A.M.C. .. .. ,, 3 ,,

WHITE FORCE.

Brigadier-General R. C. B. Haking, C.B.	Commanding.
Captain D. S. Gilkinson, Brigade Major 5th Infantry Brigade	Staff Officer.
Captain F. L. Festing, Att. General Staff	Staff Officer.

Cavalry.

Lieutenant-Colonel T. T. Pitman .. .. Commanding.
11th Hussars. "B" Squadron, 15th Hussars.

Artillery.

R.H.A.—"I" Battery, Royal Horse Artillery.
31st Brigade, R.F.A.

5th Infantry Brigade.

2nd Suffolk Regt. 2nd Worcestershire Regt.
1st Bedfordshire Regt. 2nd Oxfordshire and Buckinghamshire L.I.
1st Liverpool Regt. (Pole Target Battalions).
2nd Royal Inniskilling Fusiliers (Pole Target Battalions).
Det. 5th (Field) Company, R.E. Det. 2nd Signal Company, R.E.

R.A.M.C. Officers Attached.

5th Infantry Brigade	Major D. E. Curme.
Divisional Troops	Captain T. B. Moriarty.

NOTES FROM COLCHESTER.—Major J. B. Clarke writes, August 5, 1913: "A farewell dinner was given to Major and Quartermaster A. Bruce at the Cups Hotel, Colchester, on August 1, 1913, on his retirement from the Corps after thirty-four years' service. The following officers were present: Colonel F. J. Jencken, A.D.M.S., Colchester District; Lieutenant-Colonel T. B. Winter; Majors J. F. M. Kelly, F. Kiddle, P. S. Lelean, J. B. Clarke; Captains T. S. Dudding, F. J. Garland, A. M. Pollard, and Lieutenant W. Stewart. Major H. W. H. O'Reilly was unavoidably absent, owing to being on the sick list.

"Colonel Jencken proposed the health of the guest of the evening in felicitous terms, referring to Major Bruce's long and honourable service and to the respect and esteem in which he was held by all ranks of the Corps. In conclusion, he wished Major Bruce all success and happiness during his well-earned retirement.

"Major Bruce, who was evidently touched by the warmth of his reception, replied in a few well-chosen phrases, and a pleasant evening came to a successful conclusion.

"The following is the record of Major Bruce's service: Enlisted in the Army Hospital Corps, August 4, 1879; appointed Warrant Officer, March 16, 1892; promoted Lieutenant and Quartermaster, November 24, 1897; promoted Captain and Quartermaster, August 22, 1902; promoted Major and Quartermaster, September 23, 1908; awarded increased pay for 'distinguished service in the field'; promoted to Captain for 'distinguished service in the field'; promoted to Major for 'distinguished service other than in the field'; received the thanks of the Transvaal Government for services with the Burgher Camps; received the thanks of the Transvaal Government for services with the 'Education Department,' whilst employed as 'Organizing Inspector of Schools.' Twice mentioned in Dispatches. King's Medal and four clasps. Queen's Medal and two clasps."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants to be Captains: Philip W. Mathew, dated June 30, 1913; Gordon R. Ward, dated July 8, 1913; George E. Shand, M.B., dated July 20, 1913; Sidney J. Steward, M.D., dated July 28, 1913; Duncan Macfadyen, M.B., dated August 26, 1913.

The undermentioned to be Lieutenants (on probation): Frederick Livingstone Tulloch, M.B., late Cadet Lance-Serjeant, Edinburgh University Contingent, O.T.C., dated June 16, 1913. Cadet George Harris Haines, from the University of London

Contingent, O.T.C., dated June 17, 1913. Cadet Serjeant Howell Gwynne Jones, from the University of London Contingent, O.T.C., dated June 20, 1913. Cadet Lance-Corporal John Francis William Meenan, from the Belfast University Contingent, O.T.C., dated June 27, 1913. Cadet Staff-Serjeant Thomas William Edward Elliott, from the Belfast University Contingent, O.T.C., dated July 7, 1913. Robert Montgomery, M.B., dated July 11, 1913. Cadet Claud Aldous Slaughter, from the Edinburgh University Contingent, O.T.C., dated July 14, 1913. Cadet Serjeant William Ashley Lethem, from the Edinburgh University Contingent, O.T.C., dated July 20, 1913. Cadet Serjeant Stanley Wall Hoyland, from the Edinburgh University Contingent, O.T.C., dated July 25, 1913.

Lieutenant George F. Randall, from the seconded list, is restored to the establishment, dated June 21, 1913.

The undermentioned Lieutenants are confirmed in their rank: William C. Davidson, James Gossip, Ivan L. Waddell, James Rafter, Francis O. L. Moore.

TERRITORIAL FORCE.

Royal Army Medical Corps.

1st East Anglian Field Ambulance.—Lieutenant-Colonel Francis A. Brooks resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 19, 1913.

2nd London (City of London) Field Ambulance.—Leonard Austin Harwood to be Lieutenant, dated June 2, 1913.

Hubert Pinto-Leite to be Lieutenant, dated June 16, 1913.

2nd South Midland Field Ambulance.—Transport Officer and Honorary Captain John H. Yates is granted the honorary rank of Major, dated May 18, 1913.

Eastern Mounted Brigade Field Ambulance.—Captain Meredith S. Doubble resigns his commission, dated July 23, 1913.

3rd Northern General Hospital.—Captain George H. Pooley, F.R.C.S., from the List of Officers whose services are available on mobilization, to be Captain in the permanent personnel, dated July 30, 1913.

3rd Highland Field Ambulance.—Captain John Tait, from the List of Officers attached to units other than Medical Units, to be Captain, dated July 12, 1913.

Captain John Tait is appointed to act as Transport Officer, dated July 12, 1913.

2nd London (City of London) Field Ambulance.—Lieutenant Leslie Rawes, from the 3rd Wessex Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated July 9, 1913.

3rd South Midland Field Ambulance.—David Wylie Rintoul, M.B. (late Cadet, St. Andrews University Contingent, Senior Division, Officers' Training Corps), to be Lieutenant, dated June 1, 1913.

1st London (City of London) Field Ambulance.—Lieutenant Duncan C. L. Fitz-williams, M.D., F.R.C.S., to be Captain, dated July 3, 1913.

Lieutenant-Colonel Thomas Robinson Glynn, M.D., 1st Western General Hospital, Royal Army Medical Corps, is appointed to the Honorary Colonelcy of the Royal Army Medical Corps, Territorial Force, of the West Lancashire Territorial Division, *vice* Honorary Colonel Richard Caton, M.D., F.R.C.P., who is retired on completion of the tenure of his appointment.

4th London Field Ambulance.—Lieutenant Alfred John Williamson, M.B., from the 1st Highland Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated June 19, 1913.

1st North Midland Field Ambulance.—Captain James D. Allen, M.B., resigns his commission, dated August 9, 1913.

1st Northern General Hospital.—William Frank Wilson, M.B., to be Captain, whose services will be available on mobilization, dated August 9, 1913.

The appointment of Lieutenant-Colonel Thomas Robinson Glynn, M.D., 1st Western General Hospital, Royal Army Medical Corps, to, and the retirement of Honorary Colonel Richard Caton, M.D., F.R.C.P., from, the Honorary Colonelcy of the Royal Army Medical Corps, Territorial Force, of the West Lancashire Territorial Division, is dated August 13, 1913.

1st South Midland Mounted Brigade Field Ambulance.—Alexander Leggat to be Lieutenant, dated July 19, 1913.

3rd East Lancashire Field Ambulance.—John Knowles Lund to be Lieutenant, dated July 2, 1913.

2nd Northumbrian Field Ambulance.—Transport Officer and Honorary Lieutenant Alfred Johnson resigns his commission, dated August 20, 1913.

2nd Welsh Field Ambulance.—Major Edward T. Collins to be Lieutenant-Colonel, dated July 10, 1913.

John Wallace, M.B., late Lieutenant, 2nd Glamorganshire Royal Garrison Artillery (Volunteers), to be Lieutenant, dated July 10, 1913.

3rd Wessex Field Ambulance.—Lieutenant Elliott B. Bird to be Captain, dated May 23, 1913.

1st Western General Hospital.—Lieutenant-Colonel Nathan Raw, M.D., F.R.C.S., on completion of his period of service in command of a General Hospital, is retired, dated August 20, 1913.

Major Archibald B. Gemmel to be Lieutenant-Colonel, dated August 20, 1913.

3rd London (City of London) Field Ambulance.—Lieutenant Reginald Martin Vick to be Captain, dated May 22, 1913.

2nd London Sanitary Company.—William Arthur Berry, M.B., to be Lieutenant, dated June 23, 1913.

Sanitary Service.

Major David Smart, M.B., to be Lieutenant-Colonel, dated March 20, 1913.

Alfred Greenwood to be Major, dated August 20, 1913.

Major Alfred Greenwood is appointed Sanitary Officer of a Territorial Division, dated August 20, 1913.

Captain Roger McNeill, M.D., resigns his commission, dated August 23, 1913.

Officers attached to other Units.

Lieutenant Hugh Davies, M.B., F.R.C.S., resigns his commission, dated July 19, 1913.

James George Hayes to be Lieutenant, dated May 30, 1913.

John Wotherspoon, M.B., to be Lieutenant, dated June 17, 1913.

Captain Hugh Dickie, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 26, 1913.

James Alexander Stenhouse, M.B., to be Lieutenant, dated June 9, 1913.

Captain George R. Livingston, M.D., to be Major, dated May 26, 1913.

William Jenkyns Cruickshank, M.B., to be Lieutenant, dated May 30, 1913.

George Basil Henley Jones to be Lieutenant, dated June 5, 1913.

Lieutenant Herbert E. Corbin to be Captain, dated May 20, 1913.

Captain Robert W. Forrest, M.B., to be Major, dated June 24, 1913.

John Molyneux Hamill (late Lieutenant, 4th London Brigade Company, 2nd London Divisional Transport and Supply Column, Army Service Corps) to be Lieutenant, dated August 6, 1913.

Captain Mark P. M. Collier, M.B., F.R.C.S., resigns his commission, dated August 9, 1913.

Lieutenant Percy B. Spurgin to be Captain, dated May 16, 1913.

The undermentioned officers resign their commissions, dated August 13, 1913:—

Captain Charles G. Watson, F.R.C.S.

Lieutenant Hugh S. Gaskell, M.B.

The promotion to a Captaincy of Lieutenant David R. Taylor, which was announced in the *London Gazette* of May 13, 1910, is ante-dated to April 1, 1908.

Duncan Davidson, M.B., to be Lieutenant, dated July 10, 1913.

Morrice Greer to be Lieutenant, dated July 21, 1913.

Lieutenant Richard C. Clarke, M.B., to be Captain, dated May 22, 1913.

Lieutenant James L. Wilson, M.B., resigns his commission, dated August 20, 1913.

Supernumerary for Service with the Officers' Training Corps.

Harold Kinder Griffith, M.B., late Lieutenant, 9th (County of London) Battalion, The London Regiment (Queen Victoria's Rifles), to be Lieutenant, for service with the medical unit of the University of London Contingent, Senior Division, Officers' Training Corps, dated July 23, 1913.

UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Frank Whitaker (late Cadet Corporal, Cambridge University Contingent, Senior Division, Officers' Training Corps) to be Second Lieutenant, for service with the Field Ambulance Section of the Cambridge University Contingent, Senior Division, Officers Training Corps, dated June 1, 1913.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Staff Nurses: Miss M. D. Cashmore, to Cosham, from Woolwich; Miss F. C. Craig, to Cairo, on arrival in Egypt; Miss A. L. Fielding, to Colchester, on provisional appointment.

Appointments Confirmed.—Staff-Nurses: Miss E. E. O'Connell, Miss W. B. Allen, Miss C. Slaney, Miss A. M. Pattullo, Miss P. A. Pearse.

SEVENTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

CONVERSAZIONE AT THE ROYAL ARMY MEDICAL COLLEGE.

To celebrate this great occasion the Director-General, Army Medical Service, and Officers of the Royal Army Medical Corps Mess, London, gave a conversazione at the Royal Army Medical College, on Thursday, August 7, to more than 600 distinguished guests. After being received by Sir Launcelotte and Lady Gubbins, the guests passed into the ante-room, where the band of the Royal Army Medical Corps was playing the selection given below.

The guests were chiefly members of the Congress, with ladies, and among them may be mentioned: Colonel Sir E. W. D. Ward, Surgeon-General Sir Pardey Lukis, Brigadier-General D. Henderson, Brigadier-General S. S. Long, Lieutenant-Colonel G. D. Hunter, Colonel J. Cantlie, Colonel J. Magill, Miss E. McCarthy, Colonel E. M. Hemming, Sir Havelock and Lady Charles, Sir J. and Lady Rose Bradford, Sir Henry Morris, Dr. Millican, Sir Lambert H. Ormsby and ladies, Mr. Soulsby, Sir John and Lady Broadbent, Dr. C. J. Martin, Fleet-Surgeon R. C. Munday, Fleet-Surgeon W. Wiles, Lieutenant-Colonel W. Pasteur, Mr. A. E. J. Barker, Major E. B. Waggett, Dr. F. Foord Caiger, Sir A. A. Bowlby, Lieutenant-Colonel P. J. Freyer, Professor T. Sinclair, Mr. D'Arcy Power, Sir Charles Cuffe, Lieutenant-Colonel A. M. Davies, Surgeon-General and Mrs. Donovan, Lieutenant-Colonel H. E. R. James, Colonel A. Peterkin, Fleet-Surgeon W. L. Martin, Fleet-Surgeon P. W. Bassett-Smith, C.B., Ernest E. Austin, Esq., Méd. Ins.-Gen. Bertrand, Surgeon-General-Commentadore Calcagno, Dr. Dobo Desidorius, Mr. J. Hartley Durrant, Lieutenant-Colonel J. T. Fotheringham, Medical Inspector Dr. C. F. Humme, Colonel Guy Carleton Jones, Assistant-Surgeon-General J. W. Kerr, Méd. Major L'Herminier, Dr. Lothoioir, Professor Dr. Georg Mayer, Oberstabsarzst Dr. Niehues, Surgeon-Inspector I. Nishi, Surgeon-Colonel Rho, Excellenz v. Schjerning, Méd. Insp.-Gén. Vaillard, Med. Princ. Vincent, Deputy-Surgeon-General Welch, Lieutenant-Colonel Dr. Zeehuisen, Sir David and Lady Bruce, Dr. A. Maniu, Captain-Surgeon Dr. Zoltan de Ajkay, Surgeon-General W. E. Burnett, Dr. Ladislaus v. Farkas, Stabsarzst Dr. Hintze, Colonel P. Hehir, Major T. Marnyama, Major Dr. Nieuhaus, Marine Oberstabsarzst Dr. Staby, Rear-Admiral Van Reypen, Miss McCaul Anderson, Miss Babtie, Oberstabsarzt Dr. Bassenge, Miss Martin, R.R.C., and two sisters, Oberstabsarzt Dr. Max Neuburger, Oberstabsarzt Dr. Hugo Wagener, Marine Generaloberstabsarzt Dr. Martini, Mr. C. E. Fagan.

A series of exhibits, as shown in the programme subjoined, had been arranged by the Professors and was on view in the College. These attracted much attention, especially from the scientific experts of the world, who devoted much of their time to an examination of the work of the Corps thus exemplified.

Exhibits.

Room 1.—(*a*) Method of determining the energy value of food by the Bomb Calorimeter; (*b*) Field Service Rations: British Army; (*c*) Reserve Rations of European Powers; (*d*) Model Field Hospital Bedstead, 1803; (*e*) Models, Field Incinerators; (*f*) Demonstration of Insects injurious to Biscuits; (*g*) Method of determining the temperature of Foods during cooking.

Room 2.—X-ray Apparatus—Screen Demonstration.

Room 3.—(*a*) Media used for isolation of Typhoid Bacilli; (*b*) demonstration of some changes in the morphology of the Typhoid Bacillus.

Room 4.—(*a*) High frequency Electricity; (*b*) Vibrator; (*c*) stereoscopic skiagrams of Gun-shot Wounds, &c.

Room 5.[1]—Methods of Purifying Water: (*a*) Filtration; (*b*) heat sterilization; (*c*) sterilization by ultra-violet rays; (*d*) chemical sterilization.

Room 6.[1]—(*a*) Methods of Food Analysis; (*b*) Professor Walker's graphic method of demonstrating pin-holes in tin plate; (*c*) method of extracting gases from liquids; (*d*) Dennstedt's Combustion Furnace; (*e*) changes in sterilized milks due to bacterial activity and increased temperature.

Room 7.[1]—Clothing and Equipments of various Armies.

Room 8.—Demonstration of Leishmaniasis and Spirochætosis.

Rooms 9 and 10.—Demonstration of Undulant Fever, and of some parasites of the Mole.

Room 11.—A series of microscopic and other specimens illustrative of the following subjects: Pneumonia, Tuberculosis, Anthrax, Malaria, Diphtheria, Leprosy, Actinomycosis, Poliomyelitis, Plague, Cholera, Acne, Helminths, Protozoal Diseases, Biting Flies, Ticks, &c.

Room 12.—Demonstration of the Preparation and Standardization of Anti-Typhoid Vaccine.

Room 13.—(*a*) Specimens illustrating complement deviation in the diagnosis of disease; (*b*) specimens of spirochætes shown by dark ground illumination, and various staining methods.

Room 14.—(*a*) Consulting room methods for exact diagnosis: (i) of treponema pallidum; (ii) by Wassermann's reaction.

(*b*) Isolation of *Micrococcus melitensis* from small samples of blood received from abroad.

Room 15.—(*a*) Demonstration of Bacteria associated with Chronic Colitis; (*b*) Statistical Tables indicating reduction of Disease-incidence in India; (*c*) Microscopic Blood-specimens—Acholuric Jaundice, Chloroma.

Lecture Theatre.—Cinematograph: Demonstration of Spirochætes, the Mechanism of Phagocytosis, &c., &c.

Surgical Museum (Second Floor).—(*a*) Field Medical and Surgical Equipment; (*b*) New Field Service X-ray Outfit.

Although the Conversazione was timed to be completed at 11.30 p.m., the proceedings were carried on with considerable animation to an early hour on the following morning.

Programme.

(1)	*March*	"El Abanico"	*Javaloyes*
(2)	*Overture*	"Marinarella"	*Fucik*
(3)	*Valse*	"Charming"	*Joyce*
(4)	*Selection*	"Tannhäuser"	*Wagner*
(5)	*Czardas*	No. 1	*Michiels*
(6)	*Mélodie*	"Un peu d'amour"	*Silesù*
(7)	*Valse*	"Hommage aux Dames"	*Waldteufel*
(8)	*Selection*	"The Yeomen of the Guard"	*Sullivan*
(9)	*Song*	"Husheen"	*A. Needham*
		Cornet Solo: Bandsman Rolfe.	
(10)	*Morceaux*	(*a*) "Idylle"	*Elgar*
		(*b*) "Brise de soir"	*Gillet*
(11)	*Selection*	"La Bohème"	*Puccini*
(12)		"Kleine Serenade"	*Moszkowski*
(13)	*Cuban Dance*	"Trocha"	*Tyres*
(14)	*Two-Step*	"O you beautiful Doll!"	*Ayer*

"God Save the King!"

Conductor: Mr. F. Bradley, *Bandmaster R.A.M.C.*

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[1] In basement.

DINNER TO THE SENIOR REPRESENTATIVES OF FOREIGN ARMY MEDICAL SERVICES.

On Friday, August 8, the Directors-General and their Staffs of the Medical Department, Royal Navy, British and Indian Armies and the President of the Medical Board, India Office, entertained the following distinguished officers of Foreign Army Medical Services at dinner in the Junior United Service Club.

Excellenz Professor Dr. v. Schjerning, Generalstabsarzt der Armee; Tenente-Generale Medico L. di Cavallerleone, Ispettore Capo di Sanita Militare; Général Médecin de Raptchewski; Generale Medico Commendatore B. Calcagno, Ispettore di Sanita Militare Marittima; Médecin Inspecteur-Général Vaillard; Surgeon-Inspector I. Nishi, Imperial Japanese Navy.

The party broke up about 10 p.m., and proceeded to the Lord Mayor's reception at the Guildhall.

DINNER TO THE SECTION OF NAVAL AND MILITARY MEDICINE.

On Monday, August 11, the Director-General, Army Medical Service, and Officers of the Royal Army Medical Corps, London, as representatives of the whole Corps, entertained the foreign Army Medical Officers belonging to the Twentieth Section at the Royal Army Medical College mess. The guests were received by Sir Launcelotte Gubbins, D.G., A.M.S., President of the Section, in the ante-room of the mess. Hosts and guests wore full dress uniform, and as most of the European countries were represented, the assembly formed a brilliant spectacle.

After the customary toast to our King had been duly honoured, Sir Launcelotte proposed the health of our guests, and in doing so gracefully alluded to the many distinguished names of the Army Medical Services and to the various historical episodes of the respective countries represented. The toast was drunk with musical honours.

Rear-Admiral Van Reypen, late Surgeon-General, United States Navy, responded on behalf of the U.S. America; Regimentsarzt Dr. Maniu on behalf of Austro-Hungary; Médecin Inspecteur Général Vaillard on behalf of France; Excellenz von Schjerning on behalf of Germany; Tenente-Generale Medico L. di Cavallerleone on behalf of Italy; Médecin Inspecteur Général Humme on behalf of the Netherlands; and Médecin Inspecteur General de Raptchewski on behalf of Russia.

Excellenz v. Schjerning, the senior guest, then proposed the health of the two Secretaries, Fleet-Surgeon W. L. Martin and Major C. E. Pollock, R.A.M.C., who duly responded.

The guests dispersed shortly after midnight. A most convivial evening was passed, during which many fresh friendships were formed, and this in spite of that difficulty of communication which has existed since the destruction of the Tower of Babel, a difficulty circumvented to some extent by the use of signs.

The following is a list of the guests and hosts :—

Guests.—Excell. General Stabsarzt Dr. von Schjerning, Tenente-General Med. Ferrere di Cavallerleone, Méd. Inspect. Général Vaillard, Excell. Général Médécin De Raptchewski, Gén. Médécin Professor Wreden, Obergeneralarzt Dr. Stechow, Méd. Inspect. Dr. Primet, Colonel Carleton Jones, Deputy-Surgeon General Welch, Inspect. Dr. Humme, Surgeon-General Commendatore Calcagno, Surgeon-Colonel Professor Rho, Rear-Admiral W. K. Van Reypen, Méd. Principal Dr. Vincent, Colonel Med. Galli, Fleet-Surgeon Martin, Lieutenant-Colonel Arnould, Lieutenant-Colonel Dr. Zeehuisen, Lieutenant-Colonel Fotheringham, Marine General Oberstabsarzt Professor Dr. Martini, Oberstabsarzt Dr. Bofinger, Oberstabsarzt Dr. Bassenge, Oberstabsarzt Professor Dr. Hubner, Oberstabsarzt Dr. Niehues, Oberstabsarzt Dr. Max Neuburger, Oberstabsarzt Dr. Hugo Wagener, Marine Oberstabsarzt Dr. Staby, Méd. Major Dr. Dufourt, Stabsarzt Dr. Fornet, Stabsarzt Dr. Koch, Stabsarzt Professor Dr. Möllers, Stabsarzt Dr. Ohm, Stabsarzt Dr. Weineck, Méd. Major Dr. l'Herminier, Regimentsarzt Dr. Frederick Rold, Regimentsarzt Dr. Maniu, Regimentsarzt Dr. Edler von Menz, Major Jarvis.

Hosts.—Surgeon-Generals Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., W. Babtie, V.C., C.B., C.M.G., and H. R. Whitehead, C.B.; Colonels B. M. Skinner,

M.V.O., and E. Lynden-Bell; Brevet-Colonels C. H. Melville, W. H. Horrocks, and Sir William Leishman, F.R.S., K.H.P.; Lieutenant-Colonels M. W. Russell, G. H. Barefoot, H. E. R. James, C. Birt, M. T. Yarr, O. L. Robinson, C. H. Burtchaell, J. Maher, W. W. O. Beveridge, D.S.O., B. H. Scott, and L. T. M. Nash; Brevet-Lieutenant-Colonel T. W. Gibbard; Majors F. S. Irvine, C. E. Pollock, C. C. Cumming, S. Lyle Cummins, A. J. Hull, B. R. Dennis, G. A. Moore (who voluntarily joined in the entertainment), E. M. Pilcher, D.S.O., H. A. L. Howell, S. De C. O'Grady, L. W. Harrison, W. Riach, J. W. Langstaff, J. W. H. Houghton, G. B. Stanistreet, W. S. Harrison, P. Mackessack, E. W. Siberry, and J. C. Kennedy; Captains L. Cotterill, R. G. Meredith, W. MacD. MacDowall, G. A. D. Harvey, W. Benson, D. P. Watson, C. J. Coppinger, and Priestley; Lieutenants B. H. H. Spence, T. E. Osmond, E. B. Allnutt, J. L. Huggan, R. C. Carlyle, A. H. Bridges, and W. W. Pratt.

The Royal Army Medical Corps Band, under the direction of Mr. F. Bradley, played the following selection of music during the evening:—

PROGRAMME.

Airs caractéristiques de plusieurs Nations—		
	(*a*) Russie, (*b*) Allemagne, (*c*) Hongrie	*Moszkowski*
	(*d*) France	*Gounod*
	(*e*) Italie	*Mascagni*
	(*f*) Espagne	*Moszkowski*
Overture	"Le Ménétrier de St. Waast"	*Herman*
Selection	"Tannhäuser"	*Wagner*
Valse	"Donausagen"	*Ziehrer*
Selection	"Lucia di Lammermoor"	*Donizetti*
Morceau	"Geburtstag"	*Lincke*
Selection	"La Fille de Mme. Angôt"	*Lecocq*
Entr'acte et Mazurque—		
	(*a*) "Humoreske"	*Dvorák*
	(*b*) "Souvenir de St. Moritz"	*Venanzi*
March	"America"	*Sousa*

The chef rose to the occasion and produced an excellent dinner, the menu of which is reproduced:—

MENU.

Melon.
Consommé Tortue Claire.
Darne de Saumon Sauce d'homard.
Ris de Veau à la Régence.
Côtelettes de Mouton aux Primeurs.
Poulardes de Surrey rôties.
Salade. Chips.
Pouding sans Souci.
Pêches à la Melba.
Petits Fours.
Bonne bouchée à la Æsculapius.
Dessert.
Café.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION FOR COMMISSION IN THE ROYAL ARMY MEDICAL CORPS.

Medicine.—Case for Commentary. Wednesday, July 23, 1913. Commencing 10 a.m. (Time allowed 1½ hours.) Read your instructions.

The manager of a grocery store, aged 30, was admitted to hospital on November 30, 1911, complaining of progressive weakness, enlargement of the abdomen and shortness of breath.

He had always been a healthy man until July, 1910, when he was on holiday at Kelso, and for the first time experienced severe pain in the abdomen after food on several successive days. It was called indigestion by the doctor whom he consulted, and disappeared quickly on treatment and did not recur. In July, 1911, he found that he was losing weight and this has steadily continued. In September his friends noticed that his complexion was deteriorating and that his skin was becoming yellow. In October his abdomen began to enlarge and he was soon forced to take to bed. For the fortnight before admission it had been very tense and uncomfortable, and he had become very short of breath.

He was a poorly developed man with small muscles and little subcutaneous fat. He lay easily in bed in a semi-recumbent position. His skin and sclerotics were slightly jaundiced; the urine and the stools both contained bile. The feet and ankles were slightly œdematous. The abdomen was greatly distended and very tense, the skin being stretched and glazed, and the umbilicus protruded forming a tumour almost as large as a tangarine orange. There was evidently much free fluid in the peritoneal cavity. The diaphragm was displaced upwards and the respirations were mainly thoracic. Paracentesis on December 1 gave him much relief. The fluid contained bile, and blood in small amount. The specific gravity was 1·020 and it contained much albumen (Esbach 3·5) but no sugar. The centrifuged deposit was scanty and evidently contained red cells. Films showed that the cells which were well preserved were mainly lymphocytes, although a few polymorphoneutrophile cells and endothelial plaques were also present. Two hundred and thirty ounces were removed at the first tapping and 145 ounces at the second, three days later. The liver was now found to be greatly enlarged, the edge and surface being smooth. The spleen, too, seemed to be enlarged.

In the next fortnight the patient's condition began to improve and the jaundice lessened; but there was still much fluid in the abdomen and 250 ounces were removed on December 19. Improvement continued and he left hospital on January 19, 1912. The liver now seemed smaller, but both the edge and the surface were irregular from the presence of nodules which seemed as large as half a walnut. The jaundice and ascites still persisted but in lessened degree.

In March, 1912, he was able to resume his work and when seen in June looked much better in every way. The jaundice still persisted but was slight. The ascites had disappeared. The liver and the nodules were certainly smaller. In February, 1913, he was well and strong and at work. The skin was merely swarthy in colour, the stools were normal, and the urine was free from bile. The liver was smaller than it had been, and the nodules had disappeared, being apparently replaced by palpable depressions on the surface.

Discuss the differential diagnosis at the time of admission to hospital. State the measures that you would adopt in order to arrive at an accurate diagnosis, and suggest a suitable line of treatment.

Surgery.—Case for Commentary. Wednesday, July 23, 1913. Commencing 11.40 a.m. (Time allowed, 1½ hours.) Read your instructions.

A boy, aged 19, was admitted into hospital complaining that his right knee had suddenly bent under him, and had become locked whilst he was in the act of turning round quickly. He had previously wrenched the joint on two or three occasions whilst playing football. The joint became locked in September, 1912, and remained bent and immovable until it was reduced under an anæsthetic three days later. A similar accident happened in November, 1912, and an anæsthetic was again required, whilst in the following June chloroform had to be given again to release a third attack. Flexion of the joint, as in kneeling, led to immediate and painful fixation. Examination revealed a tender spot on the inner side of the knee over the head of the tibia, and the joint was in a state of subacute synovitis.

Discuss the probable nature of the injury. Describe the immediate and remote treatment to be adopted, and state what would be found if the joint were opened.

BIRTHS.

GWYNN.—At Rosstrevor, Malvern Wells, on June 29, the wife of Major W. P. Gwynn, R.A.M.C., of a daughter.

CORBETT.—At Kasauli, India, on July 5, 1913, the wife of Captain D. M. Corbett, R.A.M.C., of a son.

WILSON.—On July 25, 1913, at Spring Grove, Isleworth, Middlesex, to Captain and Mrs. M. Orr Wilson, a daughter.

CARMICHAEL.—At 4, Wellington Crescent, Manchester, on July 28, 1913, the wife of Captain D. G. Carmichael, R.A.M.C., of a son.

POLLOCK.—On August 23, at 22, Normanton Road, South Croydon, the wife of Major C. E. Pollock, R.A.M.C., of a daughter.

KENNEDY.—On August 26, at The Mount, Market Harboro', the wife of Major J. C. Kennedy, R.A.M.C., of a daughter.

DEATHS.

HOLLINGSWORTH.—At Isleworth, on August 1, Honorary Deputy-Surgeon-General Thomas Smith Hollingsworth, Brigade-Surgeon, retired, Medical Department, aged 86. He entered the Service as an Assistant-Surgeon (Staff) on November 3, 1854, and served as such also with the 8th Foot, 24th Foot, and Royal Engineers; became Surgeon (Staff) August 7, 1867; Surgeon, 62nd Foot, December 7, 1867; Surgeon-Major, Army Medical Department, March 1, 1873; Brigade-Surgeon, November 27, 1879, and retired on half-pay with the honorary rank of Deputy-Surgeon-General, June 9, 1880. His war service was Crimean Campaign, 1854-5. Siege and fall of Sevastopol. Medal with clasp. Turkish Medal.

NOKE.—At Northampton, on August 12, Captain Frank Herbert Noke, M.B., retired pay, late Royal Army Medical Corps, aged 35. He entered the Service as a Lieutenant, Royal Army Medical Corps, on January 30, 1904; became Captain July 30, 1907; and retired on retired pay on September 20, 1911.

BUCHANAN.—In London, on August 22, Major George Johnstone Buchanan, Royal Army Medical Corps, aged 48. He entered the Service as a Surgeon-Lieutenant, Medical Staff, on January 30, 1892; became Surgeon-Captain, Army Medical Staff, January 30, 1895; and Major, Royal Army Medical Corps, January 30, 1904. His war service was: Operations on N.W. Frontier of India, 1897-8. Medal with clasp.

NOTICE.

Major J. H. Barbour, R.A.M.C., wishes to recommend his Bearer, Subhankhan, to any R.A.M.C. officer, married or single, coming out to Northern India this trooping season, at or after the end of October.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

Major, due to return next trooping season for three years to a good station in the Punjab, with hills every hot weather, wishes an exchange to remain at home or to go to a Colony. Apply "A. S.," c/o Messrs. Holt & Co., 3, Whitehall Place, London, S.W.

Captain, tour in India expires October, 1914, wishes to exchange with Officer due home this trooping season. Is willing to pay good Bonus. Please state sum wanted. Reply, "Q. E. D.," c/o Cox & Co., Bombay.

Lieut.-Colonel, now in India, tour expired end of 1914, wishes to exchange with Officer due for abroad season 1915-16 (or later). For further particulars apply, "Somerset," c/o Holt & Co., London, or Cox & Co., Bombay.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

Number of Reprints	Number of Pages	Cost of Reprints	Cost of Excerpts *	Extra for Covers for Reprints: As Journal, Printed on Front	Extra for Covers for Reprints: As Journal, Plain, Unprinted	Extra for Covers for Reprints: Cheaper Paper, Printed on Front	Extra for Covers for Reprints: Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W.

Communications have been received from Colonel R. H. Firth, Major J. E. Hodgson, Captain A. G. Coullie, I.M.S., Major R. J. Blackham, Lieutenant G. E. S. Bowen, R.F.A., Lieutenant L. F. K. Way, Lieutenant-Colonel H. N. Thompson, Captain A. G. Wells.

The following publications have been received:—

British: The St. Thomas's Hospital Gazette, Medical Press and Circular, Yellow Fever Bureau Bulletin, The Cavalry Journal, The Lancet, The Indian Medical Gazette, The Transvaal Medical Journal, The Australasian Medical Gazette, The Hospital, Army and Navy Gazette, The Middlesex Hospital Journal, The Practitioner, The Royal Engineers' Journal, Guy's Hospital Gazette, St. Bartholomew's Hospital Journal, Tropical Diseases Bulletin, Public Health, The Liverpool Medico-Chirurgical Journal, Red Cross and Ambulance News, The Medical Review, Journal of the Supply and Transport Corps (Indian Army), Tropical Veterinary Bulletin, The Journal of Vaccine Therapy, The Commonwealth Military Journal, The Indian Medical Journal, St. Thomas's Hospital Reports, Vol. xl., *Annals of Tropical Medicine and Parasitology, The Army Service Corps Journal, Journal of the Royal United Service Institution, The Journal of Tropical Medicine and Hygiene.*

Foreign: Norsk Tidsskrift for Militaermedicin, Schmidt's Jahrbücher, Archiv für Schiffs- und Tropen-Hygiene, Revista de Sanidad Militar, Archives de Médecine et de Pharmacie Militaires, Le Caducée, Archives de Médecine et Pharmacie Navales, Deutsche Militärärztliche Zeitschrift, United States Naval Medical Bulletin, Bulletin de l'Institut Pasteur, Bulletin de la Société de Pathologie Exotique, Office International D'Hygiène Publique, Bulletin of the Johns Hopkins Hospital, The Military Surgeon, American Medicine, United States Department of Agriculture, Archives de L'Institut Pasteur de Tunis, Annales D'Hygiène et de Médicine Coloniales.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

The Hon. Manager,
"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

OCTOBER, 1913.

ESTABLISHMENTS.

Royal Army Medical College: Major Stevenson L. Cummins, M.B., Royal Army Medical Corps, to be an Assistant Professor, *vice* Captain J. C. Kennedy, M.D., dated August 22, 1913.

ARMY MEDICAL SERVICE.

Colonel Henry H. Johnston, C.B., M.D., is placed on retired pay, dated September 13, 1913.

Colonel Edward Butt, on completion of four years' service in his rank, is placed on the half-pay list, dated September 15, 1913.

The undermentioned Lieutenant-Colonels, from the Royal Army Medical Corps, to be Colonels: James Maher, *vice* H. H. Johnston, C.B., M.D., dated September 13, 1913; George D. Hunter, D.S.O., *vice* E. Butt, dated September 15, 1913.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Majors to be Lieutenant-Colonels: Herbert J. M. Buist, D.S.O., M.B., *vice* O. L. Robinson, supernumerary, dated August 22, 1913; George B. Stanistreet, M.B., *vice* J. Maher, dated September 13, 1913; William E. Hardy, *vice* G. B. Stanistreet, M.B., supernumerary to the Establishment, dated September 13, 1913; James E. Brogden, *vice* G. D. Hunter, D.S.O., dated September 15, 1913.

Captain Douglas P. Watson, M.B., is seconded for service under the Colonial Office, dated September 10, 1913.

Captain Arthur Waltham Howlett, M.B., from the Indian Medical Service, to be Captain, *vice* Duncan Coutts, M.B., who exchanges, dated July 29, 1913.

HIGHER RATE OF PAY.—Lieutenant-Colonels J. S. Davidson and J. Will have been selected for the increased pay under Article 358 of the Royal Warrant for Pay and Promotion.

ARRIVALS HOME ON LEAVE.—Majors J. V. Forrest, A. F. Weston, E. G. Ffrench and A. J. Williamson, Captains D. S. B. Thomson, J. R. Foster, J. du P. Langrishe, M. Leckie, H. G. Robertson and P. C. Field.

POSTINGS.—To the Irish Command: Major W. P. Gwynn, Captains B. Johnson, F. L. Bradish, O. C. P. Cooke, J. du P. Langrishe, G. F. Rudkin and W. B. Purdon. To the Aldershot Command: Captain W. I. Thompson. To the Northern Command: Captains G. P. A. Bracken and J. L. Wood. To Tidworth: Brevet-Colonel C. H. Melville.

TRANSFERS.—To Belfast: Lieutenant-Colonel J. H. Daly, from Limerick. To Dublin: Lieutenant-Colonel H. D. Rowan, from Tidworth. To the London District: Lieutenant-Colonel O. R. A. Julian, C.M.G., from Dublin. To Bulford, Major W. A. Ward, from the London District. To Taunton: Lieutenant-Colonel F. P. Nichols, R.P. from Bodmin.

TRANSFERS TO THE HOME ESTABLISHMENT.—From India, on September 4, Major S. W. Sweetnam, Captains G. F. Rudkin and W. B. Purdon; on September 15, Captain O. C. P. Cooke; on September 17, Captains G. P. A. Bracken, F. L. Bradish, J. A. Bennett, W. I. Thompson and J. du P. Langrishe; on September 19, Captain B. Johnson; on October 2, Major W. P. Gwynn; on October 9, Brevet-Colonel C. H. Melville (by exchange); on October 14, Lieutenant-Colonel J. W. Bullen; on October 26, Captain J. L. Wood.

APPOINTMENTS.—Colonel J. Maher, Deputy Director of Medical Services, Gibraltar. Lieutenant-Colonel J. H. Daly, charge of the Military Hospital, Belfast, and Senior Medical Officer, North Irish Coast Defences. Lieutenant Colonel H. D. Rowan, charge of the King George V. Military Hospital, Dublin. Brevet-Colonel C. H. Melville, charge of the Military Hospital, Tidworth. Major J. C. Kennedy, a Clinical Pathologist at the R.A.M. College. Captain W. F. Ellis, to be a specialist in Operative Surgery, Aldershot Command.

RETIRED PAY APPOINTMENT.—Lieutenant-Colonel W. C. Beevor, C.M.G., to be Deputy Assistant Director of Medical Services, North Midland Division Territorial Force.

QUALIFICATIONS.—Captain H. G. Sherren has obtained the Diploma in Public Health of the Royal College of Physicians, London, and Royal College of Surgeons, England; Captain B. Johnson the degrees of M.B., B.Ch., B.A.O., of the University of Dublin. Captain C. A. J. A. Balck has qualified as a First Class Interpreter in the French language.

ROSTER FOR SERVICE ABROAD.—Lieutenant-Colonel J. M. F. Shine and Major J. W. Houghton have been permitted to exchange to India with Brevet Colonel C. H. Melville and Major J. S. Bostock respectively. Captain R. E. Humfrey and Lieutenant E. A. Strachan, have been permitted to exchange destinations in India and dates of sailing with Captain T. C. C. Leslie and Lieutenant R. W. Vint respectively.

EMBARKATIONS.—For Straits Settlements: On September 3, Major H. A. Davidson, Captain J. G. Bell and Lieutenant W. F. Christie. For India: on September 12, Majors R. L. Argles and L. L. G. Thorpe, Captain A. T. Frost, Lieutenants W. Stewart and O. W. J. Wynne; on September 24, Colonel G. D. Hunter, D.S.O., Major W. Tibbits, Captains J. A. Turnbull and P. Power, Lieutenants S. P. Sykes, H. C. Todd and H. J. G. Wells. For West Africa: on September 18, Major W. M. B. Sparkes, Captains T. E. Harty and W. MacD. MacDowall. For Gibraltar: on September 26, Colonel J. Maher. For Egypt: on September 27, Major H. E. M. Douglas, V.C., D.S.O. For Hong Kong: on September 27, Majors G. B. Crisp and J. Dorgan, Quartermaster and Honorary Lieutenant C. H. Cooper. For Ceylon: on September 27, Captain R. G. Meredith.

RESULTS OF EXAMINATIONS.—The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part 2: Majors A. E. Master and S. L. Cummins.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (*b*): Brevet-Major A. B. Smallman, Captains W. F. Ellis, J. H. Campbell, E. B. Booth, F. A. McCammon, C. Scaife, E. D. Caddell, W. F. M. Loughnan, H. G. Gibson, J. du P. Langrishe, H. V. B. Byatt, D. B. McGrigor and G. S. Parkinson.

In Appendix xi, K.R., Subheads (*d*) ii and (*d*) iii: Major St. J. B. Killery, Captains W. R. Galwey, A. C. Amy and A. E. B. Jones.

In Appendix xi, K.R., Subhead (*d*) ii: Majors C. W. Mainprise, F. J. Palmer and E. V. Aylen, Captain G. F. Rugg.

In Appendix xi, K.R., Subhead (*d*) iii: Majors E. W. Bliss, M. Swabey, G. E. F. Stammers and H. C. R. Hime.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

PROMOTIONS.

SERJEANT-MAJOR.

9940	Qmr.-Serjt.	Davis, F.	21.8.13	*Vice* Taylor, discharged to pension.
10059	,,	Carnell, G. W. ..	21.8.13	*Vice* Eate, discharged to pension.
11066	,,	Lee, H. B.	1.9.13	,, Duff, ,, ,,

BUGLER.

5735	Private ..	Treanor, A. L. ..	13.8.13	*Vice* Harris to the ranks.

DISCHARGES.

9801	Sjt.-Major	Duff, H.	31.8.13	After 22 years' qualifying service.
9818	Qmr.-Serjt.	Baynes, G. R. ..	5.9.13	Termination of second period.
9839	S.-Serjt. ..	Clilverd, W. ..	20.9.13	,, ,, ,,
9305	,, ..	Maffey, H.	28.9.13	After 3 months' notice.
11246	Corporal ..	Gross, J. W. ..	15.9.13	Medically unfit.
5172	Private ..	Phillips, C. A. ..	12.8.13	Payment of £18.
7188	,, ..	Tierney, P. J. ..	14.8.13	,, £10.
16330	,, ..	Wing, J. T. ..	25.8.13	Termination of first period.
6733	,, ..	Rudman, R. W. ..	26.8.13	Medically unfit.
19044	,, ..	Humphrey, H. H...	4.9.13	Termination of second period.
5095	,, ..	Peyton, T.	29.8.13	Medically unfit.
9815	,, ..	Leaf, A.	4.9.13	Termination of second period.
7288	,, ..	Hacking, H. ..	6.9.13	Payment of £10.
9933	,, ..	Worth, S.	11.9.13	After 18 years.

TRANSFERS TO ARMY RESERVE.

571	Pte.	Saunders, T. W.	12.8.13	5080	Pte.	Harman, H. ..	25.8.13
963	,,	White, J. ..	15.8.13	5091	,,	Godfrey, J. ..	29.8.13
5062	,,	Dormedy, T. ..	11.8.13	19785	,,	Elson, T. ..	29.8.13
5072	,,	Parsons, S. T. ..	15.8.13	5099	,,	Bate, E. ..	30.8.13
5073	,,	Brands, T. D. M.	16.8.13	5094	,,	Wilson, G. ..	29.8.13
5068	,,	Moseley, J. B. M.	15.8.13	660	,,	Dotterill, H. C.	30.8.13
5065	,,	Robbins, F. J. ..	14.8.13	5104	,,	Steer, H. J. ..	30.8.13
5070	,,	Appleton, S. H.	14.8.13	5100	,,	Nicholas, W.T.G.	30.8.13
5077	,,	Gilbert, J. ..	18.8.13	5101	,,	Murray, A. L.	30.8.13
5093	,,	Stallwood, F. E.	24.8.13	5103	,,	Bateson, F. ..	31.8.13
5066	,,	Brown, T. ..	14.8.13	5087	,,	Rigby, T. W. ..	24.8.13
5067	,,	Button, S. ..	15.8.13	669	,,	Marlborough, T.A.	2.9.13
5064	,,	Horrocks, T. ..	11.8.13	681	,,	Tyrrell, H. ..	2 9.13
19963	,,	Goreham, E. ..	16.8.13	5102	,,	Randle, J. A. ..	31.8.13
5074	,,	Lawson, P. L. ..	17.8.13	5107	,,	Travers, A. E. ..	5.9.13
600	,,	Day, A. F. ..	20.8.13	5079	,,	Baker, J. A. ..	24.8.13
599	,,	Knight, F. G. ..	20.8.13	679	,,	Gazzard, W. E.	4.9.13
5084	,,	Bawden, S. B. ..	22.8.13	5109	,,	Davison, G. ..	5.9.13
5078	,,	Wagstaff, B. ..	22.8.13	5105	,,	Pawson, F. ..	5.9.13
5088	,,	Simmons, N. ..	26.8.13	5114	,,	Brown, V. S. ..	7.9.13
5098	,,	Smith, T. W. ..	28.8.13	678	,,	Reed, L. ..	4.9.13
5092	,,	Hayward, R. ..	28.8.13	698	,,	Ide, H.	9.9.13
5090	,,	Humphris, G. A.	28.8.13				

EMBARKATIONS FOR ABROAD.

To North China, per H.T. "Soudan," September 2, 1913.

2235	Corporal ..	Walkley, T.	4842	Private ..	Ricks, A. C.
5532	Private ..	Lawrence, F. E.			

DEATHS.

5882	Private ..	Springall, B. W.	10.8.13	London ..	Abscess.
17278	Serjeant ..	Forrester, J. ..	17.8.13	Edinburgh	Pneumonia.

TRANSFERS FROM OTHER CORPS.

7270	Private ..	Collier, W.	1.8.13	From 2nd Somerset Light Inf.
7296	,, ..	Percival, W. A. ..	1.9.13	,, ,, ,,

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Staff-Serjeant.

16231	Serjeant ..	Mason, H. B.	12302	Serjeant ..	Whyte, W.
13469	,,	Rogers, F.			

For Serjeant.

19272	Corporal ..	Lee, W. J.			

For Corporal.

5611	Private ..	Swatton, E. A.	7156	Private ..	McFadyen, G.
19171	,, ..	Smith, W. A.	4539	,, ..	Bews, J. A.

NOTES FROM MALTA.—Serjeant-Major Fitch writes: "On Thursday, August 7, the company gave their annual garden party. The grounds at Cottonera were tastefully decorated. The tennis court was surrounded by electric lights of various colours and a stage was erected.

"The guests, numbering about 200, began to arrive about 3 p.m. The day was very hot, but with the ample shade provided by the trees the heat was forgotten. A string band played throughout the day. The amusements consisted of see-saws, swings, roundabouts, aunt sallys, pea guessing competition, rifle shooting (miniature range), &c., &c. At 5 p.m. tea was served, and immediately afterwards a photograph of the party was taken.

"In the evening the grounds were illuminated, and dancing took place on the tennis court. The day closed pleasantly about 11 p.m.

"The whole arrangements were in the hands of Staff-Serjeant Lampard, as President, and a very strong committee, who were very successful in their undertaking.

"Serjeant-Major Fitch has been posted to headquarters as Serjeant-Major in relief of Serjeant-Major Collard, promoted.

"A very successful farewell smoker was given by the W.O. and N.C.Os. to Serjeant-Major Collard on the occasion of his leaving the Company for home on promotion to His Majesty's commission as Quartermaster. Serjeant-Major Fitch presided over the proceedings of the evening. The commanding officer and officers were present. A very enjoyable programme was given by the best local talent, including songs by Mr. Collard and Serjeant Betts, the latter rendering several comic songs in his well-known inimitable style. The usual toasts were proposed and responded to, and after chairing the guest the evening concluded with the company singing 'Auld Lang Syne,' and expressing all good wishes for his future welfare.

"Quartermaster-Serjeant Gibbs and Private Boxall returned to Malta from Scutari on September 10, prior to proceeding home to England."

NOTES FROM SIMLA.—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director of Medical Services (British Service), writes as follows, dated August 20, 1913:—

"*Leave.*—General leave ex India to the undermentioned officers has been concurred in:—

"Captain J. R. Foster, six months from August 4, 1913, reverting to the Home Establishment at the expiration thereof.

"*Specialists.*—The following officer has been appointed specialist in dermatology and appointed to the 6th (Poona) Division:—

"Captain A. S. Cane.

"*Reliefs.*—A list of tour-expired officers who have been detailed to proceed to England during the forthcoming trooping season is attached.

"The following additional tour-expired officers have been omitted from the list for the reasons stated:—

Rank and Name	Remarks
Lieutenant-Colonel M. O'D. Braddell	Leave ex India. Reverting to Home Establishment.
Lieutenant-Colonel H. N. Thompson	Ditto.
Lieutenant-Colonel J. W. Bullen	Ditto.
Lieutenant-Colonel C. W. R. Healey	Ditto.
Major S. W. Sweetnam	Ditto.
Major S. A. Archer	Ditto.
Major A. W. N. Bowen	Ditto.
Major W. P. Gwynn	Ditto.
Major H. Herrick	Ditto.
Major P. S. O'Reilly	Ditto.
Captain A. C. Amy	Ditto.
Captain B. Johnson	Ditto.
Captain J. R. Foster	Ditto.
Captain W. W. Boyce	Transferred to the half-pay list.
Captain G. P. A. Bracken	Leave ex India. Reverting to Home Establishment.
Captain F. L. Bradish	Ditto.
Captain J. A. Bennett	Ditto.
Captain W. I. Thompson	Ditto.
Captain O. C. P. Cooke	Ditto.
Captain J. L. Wood	Ditto.
Captain J. du P. Langrishe	Ditto.
Captain G. F. Rudkin	Ditto.
Captain W. B. Purdon	Ditto.
Captain F. T. Turner	Ditto.

List of tour-expired officers of the Royal Army Medical Corps detailed to embark for England in the several transports to which they have been allotted during the trooping season, 1913-14 :—

Transport and date of sailing	Rank and Name	Division or Brigade	Remarks
1st Transport "Rewa," October 10, 1913, from Bombay	Lieut.-Col. J. Girvin..	6th (Poona) Division	Medical charge.
	Major G. St. C. Thom	2nd (Rawalpindi) Division	Duty.
	,, B. Watts ..	7th (Meerut) Division	,,
	Capt. C. P. O'Brien Butler	6th (Poona) Division	,,
	,, J. J. O'Keeffe ..	8th (Lucknow) Division	,,
	,, C. Ryles ..	,, ,, ,,	,,
2nd Transport "Dongola," October 22, 1913, from Bombay	Major E. W. Slayter..	5th (Mhow) Division	Medical charge.
	,, B. F. Wingate	9th (Secunderabad) Division	Duty.
	Capt. M. B. H. Ritchie	5th (Mhow) Division	,,
	,, A. M. Benett ..	,, ,, ,,	,,
	,, T. W. Browne..	,, ,, ,,	,,
3rd Transport "Plassy," November 7, 1913, from Bombay	Lieut.-Col. D. D. Shanahan	9th (Secunderabad) Division	Medical charge.
	Major R. W. Clements	,, ,, ,,	Duty.
	,, J. D. G. Macpherson	5th (Mhow) Division	,,
	Capt. M. J. Lochrin..	9th (Secunderabad) Division	,,
	,, E. M. Middleton	2nd (Rawalpindi) Division	,,
	,, A. W. Howlett	7th (Meerut) Division	,,
4th Transport "Rohilla," November 19, 1913, from Karachi (leaves Aden November 24, 1913)	Major F. E. Gunter ..	7th (Meerut) Division	Medical charge.
	,, J. H. Barbour	3rd (Lahore) Division	Duty.
	Capt. R. G. H. Tate..	,, ,, ,,	,,
	,, E. D. Caddell ..	Aden Brigade ..	,,[1]
	,, T. H. Scott ..	3rd (Lahore) Division	,,
5th Transport "Rewa," December 10, 1913, from Bombay (leaves Aden, December 15; Malta, December 23)	Major N. Faichnie ..	7th (Meerut) Division	Medical charge.
	,, M. Swabey ..	9th (Secunderabad) Division	Duty.
	,, H. K. Palmer..	Aden Brigade ..	,,
	Capt. C. W. Bowle ..	5th (Mhow) Division	,,
	,, A. C. Elliott ..	2nd (Rawalpindi) Division	,,
6th Transport "Dongola," December 19, 1913, from Karachi	Lieut.-Col. C. W. H. Whitestone	3rd (Lahore) Division	Medical charge.
	Major E. F. O. L'Estrange	9th (Secunderabad) Division	Duty.
	Capt. D. de C. O'Grady	2nd (Rawalpindi) Division	,,
	,, W. Mitchell	3rd (Lahore) Division	,,
	,, W. E. C. Lunn	,, ,, ,,	,,

[1] Privilege leave from December 9, 1913, to date of expiration of tour.

List of tour-expired officers of the Royal Army Medical Corps detailed to embark for England in the several transports to which they have been allotted during the trooping season, 1913-14 (*Continued*) :—

Transport and date of sailing	Rank and Name	Division or Brigade	Remarks
7th Transport "Plassy," January 9, 1914, from Bombay	Lieut.-Col. M. P. C. Holt, D.S.O., V.H.S.	3rd (Lahore) Division	Medical charge.
	Major E. W. Bliss ..	4th (Quetta) Division	Duty.
	,, A. H. Safford..	8th (Lucknow) Division	,,
	Capt. E. B. Lathbury	7th (Meerut) Division	,,
8th Transport "Rohilla," January 16, 1914, from Karachi	Major W. R. Blackwell	8th (Lucknow) Division	Medical charge.
	,, J. Matthews ..	9th (Secunderabad) Division	Duty.
	Capt. A. H. Heslop ..	2nd (Rawalpindi) Division	,,
	,, R. D. O'Connor	2nd (Rawalpindi) Division	,,
9th Transport "Rewa," February 13, 1914, from Bombay	Major G. J. A. Ormsby	7th (Meerut) Division	Medical charge.
	,, H. M. Nicholls	6th (Poona) Division	Duty.
	Capt. O. R. McEwen	3rd (Lahore) Division	,,
	,, A. G. Wells ..	3rd (Lahore) Division	,,
10th Transport "Dongola," February 18, 1914, from Karachi (leaves Aden, February 23; Malta, March 3)	Lieut.-Col. J. C. Connor	9th (Secunderabad) Division	Medical charge.
	Major E. T. Inkson, V.C.	9th (Secunderabad) Division	Duty.
	Capt. W. F. M. Loughnan	Aden Brigade ..	,,
	,, M. O. Wilson ..	,, ,, ..	,,
11th Transport "Plassy," March 12, 1914, from Bombay	Lieut.-Col. F. J. Morgan	8th (Lucknow) Division	Medical charge.
	Major G. M. Goldsmith	8th (Lucknow) Division	Duty.
	Capt. C. Scaife ..	6th (Poona) Division	,,
	,, E. C. Phelan ..	8th (Lucknow) Division	,,
	,, C. H. Denyer ..	7th (Meerut) Division	,,
	,, F. Casement ..	8th (Lucknow) Division	,,
12th Transport "Rohilla," March 19, 1914, from Karachi	Lieut.-Col. (Brevet-Col.) F. Smith, D.S.O.	8th (Lucknow) Division	Medical charge.
	Major A. G. Thompson	5th (Mhow) Division	Duty.
	,, J. G. Gill ..	Burma Division ..	,,
	Capt. L. G. Gibson ..	3rd (Lahore) Division	,,
	,, D. M. Corbett..	,, ,, ,,	,,

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

Lieutenant Morton W. Ruthven, M.B., from the seconded list, is restored to the Establishment, dated August 30, 1913.

The undermentioned Lieutenants resign their commission, dated August 27, 1913: Robert H. Nolan, M.B., Henry M. Buchanan, M.B.

Lieutenant John H. C. Grene is seconded for service under the Colonial Office, dated August 23, 1913.

The undermentioned to be Lieutenants (on probation):—George Edward Pepper, late Cadet-Serjeant, Royal College of Surgeons in Ireland Contingent, Officers' Training Corps, dated July 18, 1913; Henry Colwell Rook, late Cadet Staff-Serjeant, University of London Contingent, Officers' Training Corps, dated September 4, 1913.

The undermentioned Lieutenants are confirmed in their rank: Robert C. Aitchison, Archibald M. McCutcheon, Wellington J. A. Laird, John A. Pridham, Henry C. Sinderson, Walter T. McCurry, Sydney F. M. Cesari, Francis C. Foster, Herbert S. Griffith, Christopher Atkinson, Hugh K. Ward, Henry W. Maltby, Norman V. Lothian, Kenneth A. M. Tomory, John Taylor, William Bird, William Tyrrell.

Ernest Franz Waldemar Grellier to be Lieutenant (on probation), dated August 21, 1913.

TERRITORIAL FORCE.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned officers of the Territorial Force, who have been duly recommended for the same under the terms of the Royal Warrant dated August 17, 1908:—

15th (County of London) Battalion, The London Regiment (Prince of Wales's Own, Civil Service Rifles).—Surgeon-Major Thomas Hugh Dickson, M.B., Retired List.

2nd London (City of London) Field Ambulance.—Lieutenant-Colonel William Salisbury Sharpe, M.D.

2nd London (City of London) General Hospital.—Lieutenant-Colonel Eustace Maude Callender, M.D.

Captain John Bradford, Retired List.

Captain Hugh Dickie, M.D., Retired List.

Royal Army Medical Corps.

3rd North Midland Field Ambulance.—Captain John Miller, from the 1st Wessex Field Ambulance, Royal Army Medical Corps, to be Captain, dated August 27, 1913.

3rd Highland Field Ambulance.—Major William E. Foggie, M.D., to be Lieutenant-Colonel, dated May 19, 1913.

1st East Anglian Field Ambulance.—Charles Frederick Searle, M.B., to be Lieutenant, dated August 13, 1913.

2nd West Lancashire Field Ambulance.—John Francis Roberts, M.B., to be Lieutenant, dated July 24, 1913.

Officers attached to other Units.

Lieutenant Thomas H. La N. Hewitt to be Captain, dated June 18, 1913.

Lieutenant-Colonel Edward B. Reckitt, M.D., is retired, and is granted permission to retain his rank and to wear the prescribed uniform, dated September 6, 1913.

Lieutenant Charles E. M. Jones to be Captain, dated July 1, 1913.

2nd West Lancashire Field Ambulance.—Lieutenant George C. E. Simpson, M.B., F.R.C.S., to be Captain, dated April 4, 1913.

2nd Northumbrian Field Ambulance.—Herbert William Green to be Transport Officer, with the honorary rank of Lieutenant, dated August 21, 1913.

Captain James D. Sinclair, M.D., resigns his commission, dated September 24, 1913.

2nd South-Western Mounted Brigade Field Ambulance.—Transport Officer and Honorary Lieutenant Kenneth C. Goodman resigns his commission, dated September 27, 1913.

John Bruce Cooper to be Transport Officer with the honorary rank of Lieutenant, dated September 27, 1913.

2nd Highland Field Ambulance.—Captain John Innes, M.B., resigns his commission, dated September 27, 1913.

Officers' Training Corps.

Royal College of Surgeons in Ireland Contingent, Senior Division Officers' Training Corps.—Major Auckland Campbell Geddes ceases to serve with the contingent, dated August 4, 1913.

Lieutenant Cyril H. Welch to be Captain, dated May 22, 1913.

Lieutenant Charles Corfield to be Captain, dated May 22, 1913.

Lieutenant Frederick W. Sydenham, M.D., F.R.C.S.Edin., to be Captain, dated August 11, 1913.

Surgeon-Captain William Murray Mackay, M.B., from the 6th Battalion, The Durham Light Infantry, to be Captain, dated September 24, 1913.

Charles Ernest Anderson to be Lieutenant, dated July 2, 1913.

NOTES FROM THE HIGHLAND DIVISION.—Major F. McLennan, R.A.M.C., writes: "The three Field Medical Units of the Highland Division, T.F., consisting of the 1st, 2nd, and 3rd Highland Field Ambulances, underwent combined annual training this year from July 19 to August 2 at Boards Camp, near Stirling. Colonel W. Kinnear, K.H.P., V.D., R.A.M.C., T.F., A.D.M.S., and Major A. E. Keble, R.A.M.C., D.A.D.M.S., were present during the whole period of training.

"The weather was perfect throughout, and the ground lent itself admirably to the tactical employment of medical units. On the same ground, and undergoing annual training at the same time, were the 2nd Battalion Argyll and Sutherland Highlanders, and the Argyll and Sutherland Infantry Brigade, T.F.

"Ample facilities were thus available for training the men and making them conversant with the duties which field ambulances would have to perform in war. Officers were also afforded the opportunity of gaining practical experience in tackling the many problems which arise in connection with the handling of medical units in the field, and of familiarizing themselves with the writing and issuing of orders and field messages.

"Despite the sweltering heat and strenuous days the camp was voted by officers and men as one of the most instructive and pleasant the units ever attended. On July 24 a very interesting field day in conjunction with the Voluntary Aid Detachments (women's) of the Stirlingshire branch of the Red Cross Society was held, in which the whole chain of medical organization, from the firing line to the clearing hospital, was demonstrated. The 'display' was witnessed by an interested and distinguished assembly of spectators, including the Duke and Duchess of Montrose, Major-General Woollcombe, C.B. (commanding the Highland Division), Colonel St. George Burton (commanding the Argyll and Sutherland Infantry Brigade, T.F.), and Colonel T. P. Woodhouse, D.D.M.S. On July 25, as a break in the current of their daily activities, the units marched to the historic Field of Bannockburn, where a very interesting description of the battle and the dispositions of the contending armies was given by the official guide to the battlefield.

"On July 31 the camp was visited by Colonel O'Keeffe, Inspector of Medical Services, who subjected the units to a searching inspection in the field. During the training the officers' mess held two guests' nights. On the first occasion the Brigadier and officers of the Argyll and Sutherland Infantry Brigade were entertained. On the second occasion the guest night was an 'all medical one,' the guests being the regimental medical officers of the Brigade, and several of the medical practitioners from Stirling and Denny."

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss G. M. Allen, to Wynberg, from Pretoria. Staff-Nurses: Miss I. E. Kinkead, to Aldershot; Miss A. D. M. Alban, to London; Miss D. M. Martin, to Aldershot; Miss C. R. Miller, to London, on provisional appointment; Miss M. A. McCabe, to Hong Kong, from York; Miss K. Lowe, to Hong Kong, from London.

Appointments Confirmed.—Staff-Nurses: Miss C. L. A. Robinson, Miss M. B. Smith.

ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

THE Committee of the Army Medical Officers' Widows' and Ophans' Fund wishes to bring to the notice of officers of the Corps the benefits offered by this Society; and to draw attention to its strong financial position, as disclosed by the Actuary's Report on the recent quinquennial valuation of the Fund. In this report (a copy of which may be obtained from the Secretary) the Actuary states that "the financial position of the Society continues to be eminently satisfactory," and adds that from the Fund officers can obtain "at least a minimum provision for their widows and orphans at a much lower cost than from any Life Assurance Company or other Society."

The annual subscription of a married member provides an annuity of £50, during widowhood, to the widow of the marriage, during which his subscription as a married member began. In the event of the death of the widow this annuity is continued to the children of such marriage until the youngest attains the age of 21 years. It also continues for their benefit, up to the same age, if the widow re-marries. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

Provision is also made (Rule X) whereby a part of the surplus at any quinquennial valuation may be applied for the benefit of members, or their wives, or orphan children. Thus, at the valuation as at December 31, 1910, a portion of the surplus was appropriated to bring the £50 annuities, immediate and contingent, in respect of members on the books at December 31, 1910, up to the present statutory limit of £52 per annum; and also to provide a sum of £100 (in addition to the first half-yearly annuity payment) immediately on the death of every first-class married member on the books at December 31, 1910, should he predecease his present wife.

There is every reason to presume that at the next quinquennial valuation similar additional benefits may be granted to members now joining.

Unmarried officers may become members by paying £2 yearly, and can thus reduce the rate of their subscriptions when married. They are eligible to share in such distribution of surplus as may from time to time take place under Rule X, and at the last distribution did *so benefit*. They also safeguard themselves against the possible closure of the Fund in war time, mentioned below.

A table of the rates of subscription will be found at the end of the Book of Rules, at which rates some examples are given below :—

Husband's age	Wife's age	Annual subscriptions. £	s.	d.
25	20	13	8	5
28	32	11	18	2
30	27	14	6	1
32	28	15	5	9
33	33	14	5	10
35	25	18	9	1
36	33	16	17	2
38	28	19	19	6
42	38	19	6	8
46	40	22	12	6
50	45	24	9	5
50	50	20	11	1
55	50	27	19	6

These terms cover all war and climate risks, and there are no marriage fines. But on the imminence or outbreak of war the Committee are empowered to close the Fund temporarily to applicants for membership, or to admit them at a special war rate.

Copies of the Rules, Actuary's Report, Annual Report, and Balance Sheet, together with Declaration Forms, can be obtained from the Secretary, who will be glad to give any other information in his power.

20, *Belgrave Road,*
London, S.W.

J. T. CLAPHAM, *Captain,*
Secretary.

UNITED SERVICES MEDICAL SOCIETY.

The opening meeting of the Session, 1913-14, will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Thursday, October 9, at 5 p.m. Business: (1) Presidential Address, by Colonel B. M. Skinner, M.V.O.; (2) "Problems of Mobilization Specially Affecting the R.A.M.C.," by Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., R.A.M.C. (ret.).

Staff-Surgeon A. Forrester, R.N., 7, Whitehall Place, S.W.
Captain G. A. D. Harvey, R.A.M.C., Royal Army Medical College, Grosvenor Road, S.W.
} *Hon. Secretaries.*

OBITUARY.

COLONEL CHARLES SEYMOUR.

Colonel Charles Seymour died at Wimereux, France, on August 28, aged 62. He was born on April 12, 1851, at Odiham, Hampshire. He became a member of the Royal College of Surgeons of England and a Licentiate of the Apothecaries' Society in 1876, and the same year took the M.B. and M.S. degrees of the University of Aberdeen.

He entered the Service as a Surgeon, Army Medical Department, on August 4, 1878. His first foreign tour was in Bermuda. In 1884 he proceeded to Egypt, and the following year took part in the Soudan Expedition, for which he received the medal with clasp and bronze star. He served with the Frontier Field Force 1885-6 and was present at the action of Giniss. On August 4, 1890, he was promoted Surgeon-Major, Medical Staff, and the same year was sent to Bengal, where he remained till 1897; after a year at home he returned to Bengal. On August 4, 1898, he was promoted Lieutenant-Colonel, Royal Army Medical Corps. In December, 1901, he returned home and was selected for increased pay, December 26, 1901. On June 21, 1905, he was promoted Colonel, and retired from the service April 12, 1908.

He was appointed Physician and Surgeon at the Royal Hospital, Chelsea, and was specially permitted to continue in the appointment when promoted to Colonel and as a retired officer until December 31, 1909.

COLONEL ANDREW CLARK.

The Territorial branch of the Royal Army Medical Corps has sustained a severe loss in the sad death of Colonel Andrew Clark, which occurred recently at Folkestone.

Colonel Clark joined the Volunteer Medical Service as Surgeon to the then 4th West London Volunteer Battalion of the Middlesex Regiment, and passing through the intermediate ranks was appointed Senior Medical Officer of the 3rd London Volunteer Infantry Brigade in December, 1889. Promoted Honorary Surgeon-Colonel in 1905, he was selected for the position of Assistant Director of Medical Services of the 2nd London Division, T.F., in 1908, with the rank of Colonel in the Territorial Forces. He was one of the first Medical Officers in this position to receive the distinction of King's Honorary Surgeon, which was conferred on him in 1910. At the termination of his appointment as A.D.M.S. he retired in 1912.

He was appointed an Honorary Associate of the Order of St. John of Jerusalem in 1895, and advanced to the grade of Knight of Grace in 1906. He was a member of the Committee of the British Ophthalmic Hospital in Jerusalem from 1909, and was a constant attendant at meetings of the Committee until shortly before his death.

He was also a member of the Royal Army Medical Corps Library and Journal Committee, and took a great interest in the Journal.

MAJOR GEORGE JOHNSTONE BUCHANAN.

MAJOR BUCHANAN was educated at Aberdeen University, where he took the triple Scottish qualification. He entered the Service as Surgeon-Lieutenant, Medical Staff, on January 30, 1892, became Surgeon-Captain, Army Medical Staff, January 30, 1895; and Major, Royal Army Medical Corps, January 30, 1904. Out of his twenty-one and a half years' service in the Army, he spent seventeen and a half years in India. He took part in the operations on the North-West Frontier of India, 1897-8 (Tirah Campaign), for which he received the medal and clasp. He had a good knowledge of Indian dialects, and had not only passed the higher proficiency test in Urdu, but was also appointed an examiner in this language by the Government of India. He also qualified in Punjabi, Hindi and Persian by the lower standard test. His knowledge of the Indian language stood him in good stead with natives, and he held the Cantonment Surgeoncy for five years on end at Bareilly.

MAJOR CHARLES MARLEY FLEURY.

MAJOR C. M. FLEURY died at Hong Kong on September 5, 1913. He was born at Westbury, Gloucestershire, on November 1, 1870, and was a son of the late Colonel W. L. Fleury, Army Pay Department. He entered the service as a Surgeon-Lieutenant, Army Medical Staff, on January 29, 1894, became Surgeon-Captain, Army Medical Staff, January 29, 1897, and Major, Royal Army Medical Corps, on July 29, 1905. He served abroad in India, Malta and South China.

BIRTHS.

FAWCUS.—On July 28, at 8, St. Mary's Grove, Barnes Common, S.W., the wife of Major H. B. Fawcus, of a daughter.

LEISHMAN—On September 26, at Rotherwood, Leatherhead, to Colonel Sir William and Lady Leishman, a daughter.

MARRIAGE.

BRYDEN—SMITH.—On August 7, at St. Mary's Church, Beverley, Yorkshire, by the Rev. W. Savile, Ronald Anderson Bryden, Captain, R.A.M.C., son of H. A. Bryden, Esq., of Eastbourne, to Doris Mary, eldest daughter of E. J. Smith, Esq., of Beverley, Yorkshire.

SILVER WEDDING.

NICHOL—KINGSCOTE.—On October 8, 1888, at Christ Church, Mussoorie, India, by the Rev. J. R. Robartes, Chaplain, Surgeon-Captain C. E. Nichol, Medical Staff, to Emmeline Kingscote, daughter of Major T. Gordon, Indian Army (retired).

DEATHS.

FLEURY.—At Hong Kong, on September 5, Major Charles Marley Fleury, Royal Army Medical Corps, aged 42.

SEYMOUR.—At Wimereux, France, on August 28, Colonel Charles Seymour, M.B., retired, aged 62.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

Number of Reprints	Number of Pages	Cost of Reprints	Cost of EXCERPTS *	Extra for Covers for Reprints: As Journal, Printed on Front	Extra for Covers for Reprints: As Journal, Plain, Unprinted	Extra for Covers for Reprints: Cheaper Paper, Printed on Front	Extra for Covers for Reprints: Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

CASES FOR BINDING VOLUMES.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Colonel R. H. Firth, Captain J. H. Duguid and Lieutenant W. T. Graham, Lieutenant-Colonel O. L. Robinson, Surgeon-Colonel J. Aikman, Dr. A. W. G. Bagshawe, Major H. V. Prynne, Captain R. C. Priest, Captain F. A. H. Clarke, Captain J. E. M. Boyd, Lieutenant Colonel A. P. Blenkinsop, Surgeon-Major-General Sir A. F. Bradshaw, Captain W. D. C. Kelly, Colonel W. H. Horrocks, Colonel J. M. Beamish, Major E. E. Ellery.

The following publications have been received:—

British: Guy's Hospital Gazette, Journal of the United Service Institution of India, Medical Press and Circular, Transvaal Medical Journal, The Lancet, The Hospital, The Australasian Medical Gazette, Army and Navy Gazette, The Practitioner, Tropical Diseases Bulletin, The Royal Engineers' Journal, Red Cross and Ambulance News, St. Bartholomew's Hospital Journal, The Journal of State Medicine, The Medical Review, Indian Medical Journal, The Journal of Tropical Medicine and Hygiene, The Proceedings of the Second All India Sanitary Conference, Public Health, Clinical Excerpts, The Army Service Corps Journal, Journal of the Royal United Service Institution, The Medical Journal of South Africa.

Foreign: Schmidt's Jahrbücher, Archives de Médecine et de Pharmacie Militaires, Archiv für Schiffs- und Tropen-Hygiene, Memorias do Instituto Oswaldo Cruz, Revista de Sanidad Militar, Deutsche Militärärztliche Zeitschrift, Archives de Médecine et Pharmacie Navales, The Military Surgeon, La Caducée, Giornale di Medicina Militaire, Bulletin of the Johns Hopkins Hospital, American Medicine, Bulletin de l'Institut Pasteur.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

The Hon. Manager,
"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

November, 1913.

ESTABLISHMENTS.

Royal Army Medical Corps Training Establishment, Lieutenant-Colonel Alexander A. Sutton, D.S.O., Royal Army Medical Corps, to be Commandant, *vice* Colonel George D. Hunter, D.S.O., dated September 20, 1913.

Royal Hospital, Chelsea, Lieutenant-Colonel Oliver R. A. Julian, C.M.G., Royal Army Medical Corps, to be Physician and Surgeon, *vice* Lieutenant-Colonel R. J. C. Cottell, retired, dated October 13, 1913.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Reginald J. C. Cottell is placed on retired pay, dated October 13, 1913.

The undermentioned Majors to be Lieutenant-Colonels: Gerard W. Tate, M.B., *vice* J. Ritchie, deceased, dated October 7, 1913; Norman Faichnie, M.B., *vice* O. R. A. Julian, C.M.G., supernumerary, dated October 13, 1913.

Captain Henry W. Long, M.B., to be Major, dated June 27, 1913.

Captain Charles V. B. Stanley, M.D., retires receiving a gratuity, dated October 22, 1913.

ARRIVALS HOME FOR DUTY.—From West Africa: on October 15, Captain J. T. McEntire; on October 17, Lieutenant-Colonel J. J. Gerrard, Major J. C. B. Statham.

ARRIVALS HOME ON LEAVE.—Major H. L. W. Norrington, Captains C. M. Drew, W. R. O'Farrell, W. E. Marshall, W. Mathieson and T. W. Stallybrass.

POSTINGS.—Scottish Command: Lieutenant-Colonel H. N. Thompson, D.S.O. Northern Command: Lieutenant-Colonel J. W. Bullen. Eastern Command; Major P. S. O'Reilly. Irish Command: Lieutenant-Colonel M. O'D. Braddell, Major H. Herrick. London District: Lieutenant-Colonel C. W. R. Healey, Captain N. E. J. Harding.

TRANSFERS.—To Richmond, Yorks: Major T. C. MacKenzie, D.S.O., from Dover; to York: Captain L. A. A. Andrews, from Cork.

TRANSFERS TO THE HOME ESTABLISHMENT.—From India, on October 26, Lieutenant-Colonel M. O'D. Braddell; on November 3, Lieutenant-Colonel C. W. R. Healey; on November 6, Major H. Herrick; on November 10, Major P. S. O'Reilly; on November 11, Lieutenant-Colonel H. N. Thompson, D.S.O.

APPOINTMENTS.—Lieutenant-Colonel H. N. Thompson, D.S.O., Deputy Director of Medical Services, Scottish Command. Major N. J. C. Rutherford, Sanitary Officer, Cork District. Major T. C. MacKenzie, D.S.O., D.A.D.M.S., Northumbrian Division, T.F. Captain W. G. Maydon, Adjutant, R.A.M.C. School of Instruction, West

Lancashire Division, T.F. Captain L. A. A. Andrews, Specialist in Dermatology and Venereal Diseases, Northern Command. Captain B. A. Odlum, Instructor in Medical Corps duties at the South African Military College.

RETIRED PAY APPOINTMENTS.—Major C. W. Reilly, Medical Charge at Bodmin. Major G. S. Mansfield, Medical Charge at St. Peter's, Jersey. Major E. M. Williams, Medical Charge at Leicester.

The undermentioned retired pay appointments are vacant: Netheravon, Berehaven, Lancaster, Fort Efford and Mutley District.

QUALIFICATIONS.—Captain J. E. H. Gatt has obtained the Diploma in Public Health of the Royal College of Physicians and Surgeons, Edinburgh, and Royal Faculty of Physicians and Surgeons, Glasgow, the Diploma in Tropical Medicine and Hygiene of the University of Cambridge, and the certificate of the London School of Tropical Medicine (with distinction, having obtained 75 per cent. of marks, bracketed third place).

ROSTER FOR SERVICE ABROAD.—Captain C. P. O'Brien-Butler has exchanged to a higher position on the roster with Captain H. L. Howell. Captain J. B. Meldon has been permitted to exchange to Gibraltar with Captain T. H. Dickson, who will proceed to India.

EMBARKATIONS.—For Malta: On September 28, Captain W. F. H. Vaughan; on October 15, Major C. C. Cumming. For India: on October 1, Lieutenant A. S. Heale (at Malta); on October 9, Lieutenant-Colonel J. M. F. Shine, Majors N. H. Ross and F. Harvey, Captains H. W. Russell and G. S. Wallace, Lieutenants L. Buckley, E. B. Allnutt and E. C. Deane; on October 22, Lieutenant-Colonel H. M. Adamson, Majors E. E. Powell, A. L. Scott, J. W. H. Houghton, Captains J. Mackenzie and H. J. Crossley, Lieutenants T. E. Osmond, R. T. Vivian and E. G. H. Cowen.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

DISCHARGES.

10762	S.-Serjt. ..	Edwards, C. H. ..	25.9.13	Termination of second period.
9305	,, ..	Maffey, H.	28.9.13	After 3 months' notice.
1081	Serjeant ..	Holmes, G. T. ..	4.10.13	,, ,, ,,
10271	,, ..	Jebson, J. R. ..	17.10.13	Medically unfit.
9428	Corporal ..	Miller, F.	9.10.13	After 3 months' notice.
994	,, ..	Davies, G. A. ..	6.10.13	Termination of first period.
12627	,, ..	Borland, H. ..	24.10.13	At own request.
16497	,, ..	Rann, W. H. ..	17.9.13	Free, to take up employment.
6524	Private ..	Bennetts, N. ..	25.9.13	Medically unfit.
51	,, ..	Coward, G... ..	14.10.13	At own request.

TRANSFERS TO ARMY RESERVE.

5111	Pte.	Bennett, J. ..	6.9.13	5126	Pte.	Beaven, W. ..	25.9.13
5121	,,	Simson, A. ..	18.9.13	19869	,,	Baston, T. ..	24.9.13
5115	,,	Allen, C. E. E...	7.9.13	5138	,,	Ransome. D. ..	29.9.13
5116	,,	Beere, E. ..	13.9.13	5137	,,	Blackwell, A. ..	28.9.13
5237	,,	Wilkie, T. ..	3.9.13	5132	,,	McFarlane, G. H.	29.9.13
5124	,,	Couchman, H. F.	18.9.13	19896	,,	Rutt, C. W. ..	28.9.13
4781	,,	Gilbert, M. J. ..	19.9.13	5141	,,	Stovell, C. ..	2.10.13
19866	,,	Worrell, J. L. ..	20.9.13	5143	,,	Jones, E. H. ..	2.10.13
5127	,,	Manns, W. J. ..	25.9.13	5147	,,	Mullen, J. ..	4.10.13
19976	,,	Turner, T. J. ..	12.3.13	19898	L.-Cpl.	Ames, C. M. ..	3.10.13
5118	,,	O'Donohoe, W. C.	13.9.13	792	Pte.	Sherman, F. ..	3.10.13
5123	,,	Bonnett, R. ..	18.9.13	5136	,,	Holness, T. ..	2.10.13
5120	,,	Warner, W. G...	18.9.13	5145	,,	Evans, A. ..	4.10.13
5122	,,	Slocombe, H. ..	18.9.13	5142	,,	Nye, A. J. ..	2.10.13
19851	L.-Cpl.	Claydon, P. E...	14.9.13	5140	,,	Hopgood, H. J...	5.10.13
5119	Pte.	Morris, J. M. ..	13.9.13	827	,,	Stammers, A. ..	12.10.13

TRANSFERS TO OTHER CORPS.

11370	S.-Serjeant	Loveland, F. ..	2.10.13	To Notts and Derby T.F. Field Ambulance.
11513	Serjeant ..	Hinton, G... ..	6.9.13	,, Sch. of Instruction, Aberdeen T.F.
11789	,, ..	Skinner, W. ..	4.9.13	,, Sch. of Instruction, S. M. Division T.F.
4828	Private ..	Matheson, F. J. ..	15.9.13	,, A. S. Corps.

DEATHS.

5216	Pte.	Holloway, M.	18.9.13	Belfast ..	Acute ant. poliomyelitis.
2063	,,	Crofts, C. ..	29.9.13	Hong Kong	Appendicitis.

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Staff-Serjeant.

15018	Serjeant ..	Davis, A. J.	18577	Serjeant ..	Read, F. L.
10458	,, ..	Langston, W.	16678	,, ..	March, J. E.
17748	,, ..	Dissent, C. H.	11741	,, ..	Hudson, H.
12242	,, ..	Luxton, A. J.			

For Serjeant.

1848	Corporal ..	Martins, A. V.	18341	Lce.-Serjt.	Nettle, A.
18301	,, ..	Molden, C. J.	18418	Corporal ..	Smith, G.
18763	,, ..	Smith, F. J.	12618	,, ..	Mayman, W. A.

For Corporal.

12047	Private ..	Eley, H. A.	18907	Private ..	Blundell, W. J.
1746	,, ..	McLachlan, E. J.	4363	,, ..	La Roche, H.
1072	,, ..	French, H. A.	4310	,, ..	Tomlyn, F. H.
4942	,, ..	McCombie, A.	1710	,, ..	Hudson, J. R.
4991	,, ..	Shorten, B.	5024	,, ..	Ballan, D. J.
6356	,, ..	Stevens, F. D.	1615	,, ..	Paddison, J. R.
2185	,, ..	Jenkins, W. E.	4879	,, ..	Barlow, C. W.
19583	,, ..	Pickerden, T.	19591	,, ..	Rolfe, P. L.
6714	,, ..	Barnard, D.	306	,, ..	Quelch, F. G.
5918	,, ..	Blair, H.	5607	,, ..	Sowter, W. J.
6626	,, ..	Metcalf, J.	6640	,, ..	Underhill, T. G.

EMBARKATIONS FOR ABROAD.

To Ceylon, per s.s. "Malda," September 20, 1913.

4890	Private ..	Tumilty, J.	5089	Private ..	Brisbane, W.
4937	,, ..	Dunkley, H.	5150	,, ..	Jacombe, C. E.
1837	,, ..	Hopkins, C.			

To Ceylon, per h.t. "Somali," September 26, 1913.

9876	Sjt.-Major	Powell, A. G.			

To North China, per h.t. "Somali," September 26, 1913.

12743	S.-Serjt. ..	Wilson, T. R.	19650	Private ..	Gawn, H.
5786	Private ..	Burgess, F.	5345	,, ..	Pullen, A. E.

To Hong Kong, per h.t. "Somali," September 26, 1913.

19980	Corporal ..	Loder, H. G.	19864	Lce.-Corpl.	Pitt, T. R.
19619	Lce.-Corpl.	Aley, H.	5887	Private ..	Groves, W. H.
18933	Serjeant ..	Thompson, H. L.	4932	,, ..	Moran, W.
4936	Private ..	Strange, H. E.	5844	,, ..	Dilks, M.
5161	,, ..	Thayers, A. H.	15517	,, ..	Gilchrist, A.
5278	,, ..	Talbot, W. J.	5641	,, ..	Brown, T.
955	,, ..	McKechnie, R.	5106	,, ..	Clarke, A. E.

To Singapore, per H.T. "Somali," September 26, 1913.

18233	S.-Serjt. ..	Evans, A. C.	12052	Serjeant ..	Halkett, F. C.
5009	Private ..	Eales, T. H.	1894	Private ..	Benjafield, H. J.
16809	,, ..	Riding, A. E. H.	5157	,, ..	Hobday, S. W.
4841	,, ..	Clarke, A. E.			

To Sierra Leone, per s.s. "Sokoto," September 18, 1913.

18656	Corporal ..	Maywood, H. G.	19805	Corporal ..	Hanrahan, J.
18610	Private ..	Hassard, H. W.			

NOTES FROM TIDWORTH.—Lieutenant-Colonel H. D. Rowan, R.A.M.C., writes, September 25, 1913: "The cricket season is practically over, with the exception of the semi-final and final of the Hubert Hamilton Garrison Cricket Cup, which, weather permitting, after the termination of the Army Manœuvres, we have high hopes of winning.

"Taking the season as a whole, and considering the duties to be arranged for, camping season, divisional training, manœuvres, &c., our team is to be congratulated on winning so many matches.

"Looking back we find that we played in all twenty-eight matches, winning twenty-two, losing four and drawing two. Not a bad performance considering we are only a Company, and are scattered, and yet we have been able to hold our own with the different regimental teams.

"In the Garrison Cup ties, permission was granted for our side to amalgamate with the Army Ordnance Corps, which has added considerably to our chance of winning the Cup.

"Our success is mainly due to the excellent all-round work of our officers, Major L. Addams-Williams (Captain), Major W. L. Steele, Major R. V. Cowey, Captains R. B. Ainsworth and S. M. W. Meadows (Sub-Captain), and also of Corporal Cowx. The batting shows a great improvement on last year, no less than seven members of the team reaching a double figure average. The brunt of the attack was generally carried out by Captain Meadows and Corporal Cowx (the latter only requiring 7 wickets to complete his century), supported by Corporal Boxall, Majors Addams-Williams and Cowey.

"In recognition of 'services rendered,' the Commanding Officer, Major Addams-Williams and Major Cowey presented three cricket bats for the 'Best Batting Average,' 'Best Bowling Average,' and 'Most Catches,' which were won by Corporal Cowx, Lance-Corporal Boxall and Private Wickers, respectively.

"A friendly match was arranged with the Royal Victoria Hospital, Netley, on August 28, and a very nice day's outing was spent at Netley, The Tidworth party proved victorious by 177 runs. Unfortunately, at the last minute, three of our officers could not turn out owing to duty, but we borrowed a couple of our departmental friends to assist us. Scores follow.

Royal Army Medical Corps, Tidworth.

Corporal Cowx, caught Canopo, bowled Ensell	31
Qmr.-Serjt. Power (R.E.), retired	105
Conductor Spinks (A.O.C.), bowled Hemphill	25
Corporal Fryer, bowled Barber..	6
Captain Meadows, caught Ferguson, bowled Ensell	36
Lieutenant Hepper, run out	17
Major Steele, bowled Ferguson	9
Staff-Serjeant Dewberry, not out	4
Serjeant Boxshall, bowled Ensell	0
Lance-Corporal Boxall, bowled Edwards	1
Private Wickers, bowled Edwards	2
Extras	32
Total	268

Royal Victoria Hospital, Netley.

Reverend Ensell, caught Hepper, bowled Meadows	16
Mr. Moss (R.E.), bowled Cowx	5
Lieutenant McNaughton, bowled Cowx	1
,, Hemphill, stumped Power, bowled Spinks	29
Private Barber, caught Dewberry, bowled Cowx	3
Serjeant Ferguson, caught Dewberry, bowled Fryer	16
Captain Pallant, caught Boxall, bowled Cowx	3
,, Maughan, bowled Cowx	0
Serjeant Chrisp, stumped Power, bowled Spinks	8
,, Edwards, not out	2
Private Canopo, bowled Fryer	0
Extras	8
Total	91

"FINAL HUBERT HAMILTON CUP.

"*Played October* 2 *and* 3, 1913.

"The following are the scores in the final of the Hubert Hamilton Cup, which we won easily by 170 runs on the first innings. We had previously met the 9th Lancers and Wiltshire Regiment, and the Royal Irish Rifles had beaten the 18th Hussars and 3rd Battalion Worcestershire Regiment.

"*R.A.M.C. and A.O.C.*

Major Bush, A.O.C., bowled Hoare	0
,, Cowey, R.A.M.C., bowled Hoare	5
Captain Ainsworth, R.A.M.C., bowled Hutchinson	0
,, Sheppard, A.O.C., bowled Whitfield	55
,, Meadows, R.A.M.C., bowled Hutchinson	12
Corporal Cowx, R.A.M.C., ,, ,, ...	16
Conductor Spinks, A.O.C., ,, ,, ...	28
Serjeant Haick, A.O.C., ,, Hoare	19
Major Addams-Williams, R.A.M.C., not out	28
Staff-Serjeant Murray, A.O.C., l.b.w., bowled Hutchinson	17
Serjeant Bradford, A.O.C., bowled Hutchinson	4
Extras	8
Total	192

"*2nd Battalion Royal Irish Rifles.*

Captain Whelan, bowled Bush	3
Lieutenant Dillon, run out	1
,, Hutchinson, bowled Bush	7
,, Whitfield ,, ,, ...	3
Serjeant Hoare, caught Cowx, bowled Bush	0
,, Wilkie, caught Ainsworth, bowled Bush	6
Captain Master, bowled Meadows	5
Lieutenant Thomas, not out	2
Serjeant Nicholson, bowled Meadows	0
Lance-Corporal Burns, caught Cowx, bowled Meadows	0
Lieutenant Cowley, run out	0
Total	27

"Major Bush and Captain Meadows bowled excellently and seemed almost unplayable. The former took 5 wickets for 17 runs and the latter 3 for 10."

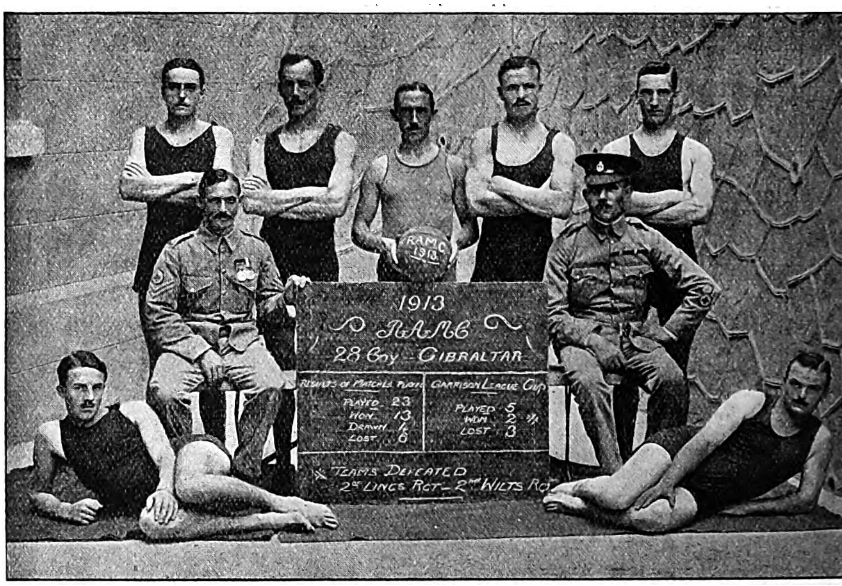
NOTES FROM GIBRALTAR.—Serjeant-Major J. Wickersham writes, October 12, 1913: "It is now some months since any Gibraltar notes have been sent to the Corps News, but in the meantime I think the Company has held its own as regards sport, considering the superiority of the teams we had to meet at cricket and water polo.

"Our cricket team has been strengthened this year by Lance-Corporal Burr and Private Watson, who joined us in March last, Watson doing well behind the stumps.

Huppler, in playing against the Gibraltar Cricket Club, scored 103 not out. Batting and bowling averages are given below.

"In water polo we did well, and hope to do better next season. A team was entered for the Garrison League Cup, in which we managed to beat the 2nd Lincoln Regiment and 2nd Wilts Regiment, but the R.G.A. and R.E. were too strong for us, although we gave them a good game. Captain Comyn took a great interest in the team and it was to this that our success was due.

"The winter season is now starting with football and hockey, also another sport, weekly drill. Our Quadrille Club is running just as strong as ever, and we have already had two very successful dances this season."



WATER POLO TEAM.

Reading from left to right.

Standing—Pte. H. E. Howell, Pte. P. G. Elsey (Secretary), Capt. K. Comyn (Captain), Pte. F. Burden, Pte. G. Lomas (Vice-Captain).

Sitting—Cpl. D. D. Court and Sjt.-Major J. Wickersham.

Reclining—Pte. H. Scott and F. Lester.

NO. 28 COMPANY, ROYAL ARMY MEDICAL CORPS' CRICKET CLUB, 1913.

Batting and Bowling Averages.

Batting.

Name	Innings	Runs	Most in an innings	Times not out	Averages
Private Dash ..	10	257	53	1	28·55
,, Huppler	22	433	103*	3	22·78
,, Griffiths	24	393	71*	5	20·68
Corporal Court	20	320	62	1	16·84
Lance-Corporal Burr	24	356	65	1	15·47
Private Watson	20	259	42*	2	14·38
,, Elsey	7	57	21	3	14·25
,, Barlow	17	189	65*	2	12·60
,, Lansdowne ..	22	211	37*	3	11·10
,, Francis	19	138	27*	3	8·62
Captain H. S. Dickson	14	109	29	1	8·37
Private Whiddon	13	83	14*	3	8·30

* Signifies not out.

Bowling.

Name	Runs	Wickets	Overs	Maiden overs	Balls bowled	Average runs per wicket
Private Huppler ..	638	60	169·5	17	1,019	10·63
,, Lansdowne ..	455	38	126	16	756	11·97
Lance-Corporal Burr	330	24	77·1	5	463	13·75
Private Whiddon ..	348	25	118	18	708	13·92
,, Francis ..	590	41	130	10	780	14·39
Corporal Court ..	199	8	54·3	7	327	24·80

NOTES FROM SIMLA.—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director of Medical Services (British Service) writes as follows, dated September 18, 1913:—

"*Leave.*—General leave ex India to the undermentioned officers has been concurred in:—

"Major B. St. J. Killery, six months, from September 15, 1913.

"Captain W. J. Tobin, six months, from September 4, 1913.

"*Postings.*—The officers detailed to proceed to India for duty during the ensuing trooping season will, on arrival, be posted to divisions as follows:—

"*1st Division.*—Major R. L. Popham; Captains L. Cotterill and J. B. Meldon.

"*2nd Division.*—Lieutenants B. H. H. Spence, A. Hood, J. M. Elliott, H. J. G. Wells, W. W. Pratt (from Southern Army).

"*3rd Division.*—Lieutenant-Colonel T. Du B. Whaite; Majors E. E. Powell, B. W. Longhurst, W. Tibbits, R. L. Argles, R. McK. Skinner; Captains A. H. Hayes, E. M. Pennefather, W. F. H. Vaughan, H. W. Russell; Lieutenants D. W. Bruce, L. Buckley, S. P. Sykes, A. G. Biggam, R. K. Mallam, W. Stevenson, J. L. Ritchie, G. A. Blake, S. J. Higgins.

"*4th Division.*—Majors L. Addams-Williams, H. D. Packer; Captain H. C. Winkworth; Lieutenants I. R. Hudleston, W. Macnaughtan.

"*5th Division.*—Lieutenant-Colonel R. Holyoake; Majors E. S. Clarke, E. E. Parkes; Captains J. A. W. Webster, J. A. Turnbull, P. Power, D. T. M. Large, D. T. Richardson.

"*6th Division.*—Lieutenant-Colonel H. M. Adamson; Majors A. L. Scott, F. Harvey; Captains F. C. Lambert, B. G. Patch, T. S. Dudding; Lieutenants E. B. Allnutt, M. Burnett, S. J. Barry.

"*7th Division.*—Lieutenant-Colonel G. A. T. Bray (from Southern Army); Major E. H. Condon; Captains H. J. Crossley, T. S. Coates, K. A. C. Doig, R. J. B. Buchanan; Lieutenants R. Davidson, H. W. L. Allott, E. G. H. Cowen, W. Stewart, E. A. Strachan, E. C. Deane (from Southern Army).

"*8th Division.*—Majors N. H. Ross, W. M. H. Spiller, J. C. Kennedy; Captains J. McKenzie, A. T. Frost, T. C. C. Leslie (from Southern Army); Lieutenants T. E. Osmond, J. H. M. Frobisher, O. W. J. Wynne, C. J. H. Little, R. W. Vint, E. P. A. Smith, C. M. Ingoldby (from Southern Army).

"*9th Division.*—Lieutenant-Colonel J. F. Donegan; Majors H. W. H. O'Reilly, L. L. G. Thorpe; Captains M. Keane, A. C. H. Gray, G. S. Wallace, R. E. Humphrey, C. E. W. S. Fawcett; Lieutenants W. B. Laird, F. R. B. Skrimshire, E. T. Vivian, H. C. Todd, C. J. Blaickie, P. A. With, H. S. Blackmore.

"*Specialists.*—The following officer has been appointed specialist in the subject and Division noted against him: Major F. M. Mangin, ophthalmology, 6th (Poona) Division."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants to be Captains:—Charles M. Page, M.B., F.R.C.S., dated September 14, 1913; George F. Randall, dated September 19, 1913; Edward T. Holland, dated September 28, 1913; John C. Hall, M.D., and William M. Biden, M.B., dated September 30, 1913.

Lieutenant Donald J. Armour, from the Royal Army Medical Corps (Territorial Force), to be Lieutenant, dated October 22, 1913.

Lieutenant Charles J. Simpson, M.B., resigns his commission, dated October 15, 1913.

The undermentioned Lieutenants are confirmed in their rank:—Henry P. Crow, Douglas R. King, Gavin Young, Allan D. Fraser, David Mackie, James J. Finlay,

Robert G. McElney, Thomas McClurkin, Maurice P. Inglis, Thomas W. E. Elliott, William A. Lethem.

TERRITORIAL FORCE.

1st Battalion, The Hertfordshire Regiment.—Surgeon-Lieutenant Arthur H. Foster resigns his commission, dated October 11, 1913.

ROYAL ARMY MEDICAL CORPS.

3rd Lowland Field Ambulance.—Lieutenant James Young, M.B., F.R.C.S., to be Captain, dated August 8, 1913.

Quartermaster and Honorary Captain (Quartermaster and Honorary Captain, retired pay) Philip Macintosh is granted the honorary rank of Major, dated August 24, 1913.

North Midland Mounted Brigade Field Ambulance.—Lieutenant William M. Hewetson, M.B., resigns his commission, dated October 8, 1913.

Welsh Border Mounted Brigade Field Ambulance.—Major Alexander G. Hamilton to be Lieutenant-Colonel, dated July 18, 1913.

3rd London General Hospital.—Captain Frederick Richard Miller, from the 6th London Field Ambulance, Royal Army Medical Corps, to be Captain in the permanent personnel, dated September 10, 1913.

1st Welsh Field Ambulance.—Lieutenant Edmund V. Connellan to be Captain, dated August 1, 1913.

2nd Welsh Field Ambulance.—Lieutenant John S. Rowlands, M.B., resigns his commission, dated October 11, 1913.

2nd Wessex Field Ambulance.—Lieutenant David Macnair, M.D., to be Captain, dated June 3, 1913.

3rd Wessex Field Ambulance.—Edgar Curnow Plummer to be Lieutenant, dated September 5, 1913.

South Wales Mounted Brigade Field Ambulance.—Captain John Griffiths to be Major, dated May 13, 1913.

Officers attached to other Units.

Lieutenant Lewis Beesly to be Captain, dated June 1, 1913.

Lieutenant-Colonel William Wilson, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 11, 1913.

Sidney Scott, M.B. (late Second Lieutenant, 4th Northumbrian (County of Durham) (Howitzer) Brigade, Royal Field Artillery), to be Lieutenant, dated October 11, 1913.

Douglas Edward Finlay, M.B., to be Lieutenant, dated September 1, 1913.

Harry Winstanley Shadwell to be Lieutenant, dated March 11, 1913.

TERRITORIAL FORCE RESERVE.

Royal Army Medical Corps.—Captain William Henry Rowell, M.D., from the Notts and Derby Mounted Brigade Field Ambulance, to be Captain, dated October 22, 1913.

NOTES FROM BIRMINGHAM.—Lieutenant-Colonel F. Marsh sends us the following cutting from the *Birmingham Daily Post*:—

"COMPLIMENTARY DINNER TO COLONEL W. H. BULL.

"On Friday, October 3, the officers of the R.A.M.C. (T.) Birmingham units entertained Colonel W. H. Bull, V.D., K.H.S., Assistant Director of Medical Services South Midland Division, at dinner in their mess at Great Brook Street Barracks, in honour of his recent appointment as honorary surgeon to the King. Lieutenant-Colonel F. Marsh presided, and in proposing Colonel Bull's health, referred to his period of service of over thirty-five years in the Volunteer and Territorial Forces, and to the great interest he took in the work, and the keenness and energy he displayed. He expressed the great satisfaction of every officer, non-commissioned officer, and man in the units that he had been the recipient of so distinguished an honour, and conveyed to him their most cordial and heartiest congratulations. Colonel Bull thanked the units for their kind congratulations and hospitality, and referred to the excellent manner in which the recent annual trainings in camp had been carried out. He paid a high tribute to the work done by the officers, and by the adjutant, Captain Bramhall. He was pleased to say the average of the strength of the R.A.M.C. units in the South Midland Division was well maintained, and that the Director-General had expressed his satisfaction thereon."

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Matrons: Miss L. W. Tulloh, R.R.C., to Hounslow from Cork. Sisters: Miss A. A. Steer, to Aldershot from Colchester; Miss E. M. Rentzsch, to Colchester from Aldershot; Miss G. Knowles, to Hounslow from Aldershot; Miss E. M. Lyde, to Aldershot from Egypt; Miss M. E. Neville, to Egypt from Hounslow; Miss E. C. Cheetham, to Cork from Devonport, as Acting Matron; Miss M. Smith, to Tidworth from South Africa; Miss M. E. Richardson, to South Africa from Tidworth. Staff-Nurses: Miss A. Lee, to Malta from London; Miss M. E. Stewart, to Dublin from Aldershot; Miss A. M. E. C. Charles, to Cosham from London; Miss P. M. Rhenius, to York from London; Miss M. Nicholson, to London from Cosham; Miss A. L. Evans, to Netley from Devonport; Miss G. M. Jones, to Woolwich from Netley; Miss E. A. Field, to Devonport on provisional appointment.

Arrivals.—Sisters Miss M. Smith, from South Africa, and Miss E. M. Lyde, from Egypt.

EXAMINATIONS.

The following questions are published for general information:—

QUARTERMASTER-SERJEANTS.

Para. 285, b. 1.

(1) Give the accommodation for sitting and lying-down cases of the three types of Ambulance Wagon.

(2) A company column is marching to a flank in fours. Give the words of command and the detail necessary to get them into column of fours moving in the same direction.

(3) The patient being on a stretcher and the bearers ready to move off, who collects his arms and equipment? What precautions should be taken with regard to the former?

(4) A company in line on the march requires to form column of half companies. What is the command?

(5) Give the detail for loading stretchers with six bearers.

(6) What will ceremonial parades be confined to?

(7) Give the detail and words of command for a company in line on the march forming company column at the halt.

(8) What are the distinguishing signs of a hospital on active service by day and by night?

Para. 285, b. 2.

(1) Answer briefly what are the regulations regarding a serjeant's mess as to the following: membership, subscriptions, mess meetings, entertainments.

(2) Explain the duties of the attendant in charge of the dining-hall with regard to the diets, and how these diets are accounted for?

(3) What is the order with regard to keeping a list of defaulters?

(4) What are the necessary qualifications for a N.C.O. to have before his name can be registered at the Record Office for employment as a clerk?

(5) When blankets are ordered to be taken by the personnel of a Cavalry Field Ambulance how are these carried?

(6) What is the normal tentage of a field ambulance, and what is the extra tentage?

(7) What articles of clothing and necessaries are left at the base by a man proceeding to the front?

(8) What is the composition in detail of the personnel Section "B" Field Ambulance, excluding officers.

Para. 285, b. 3.

(1) What are the regulations regarding the disposal of worn out personal clothing, and how are such transactions recorded?

(2) What is the procedure with regard to the equipment ledger of a unit on charge of commanding officers?

(3) Describe the articles of accoutrements issued to the various ranks of the R.A.M.C. in peace and war.

(4) How is a soldier's clothing maintained and how is the amount provided for that purpose expended and accounted for?

(5) Give the period of wear of the following articles of equipment in time of peace:—
Bottles (water).
Haversacks.
Tins (mess) and covers.

(6) What becomes of the personal clothing of a soldier discharged the service for misconduct, and what articles is he allowed to take away with him?

(7) A non-dieted hospital at a camp is about to be opened; how would you obtain (*a*) ordnance equipment, (*b*) medical equipment. What are the forms you use for (*a*) and (*b*) and what ledger would you use for the ordnance equipment?

(8) When is the identity disc issued. Where is it stored before issue and how is it disposed of on a soldier proceeding to:—
(*a*) A colony.
(*b*) Transferred to Army Reserve.

Para. 285, b. 4.

(1) What are the regulations regarding the local purchase of medicines, &c., and how are payments made?

(2) In what book is recorded the transactions in General Medical Stores. How are alterations made in it and when is it balanced at home, and when is it balanced abroad?

(3) What are the regulations regarding the disposal of surplus bottles in commands abroad?

(4) What are the rules laid down regarding medicines from different firms? How should they be kept?

(5) How is money dealt with which has been recovered in respect to losses, damages, or deficiencies of medical or surgical equipment?

(6) A serjeant loses some teeth on active service, how can he get them replaced?

(7) At the end of a voyage from India, the last of the trooping season, what becomes of the medical stores?

(8) How would you check instruments and appliances on taking over a dispensary?

Staff-Serjeants.

Para. 284, b. 1.

(1) What is the procedure when a soldier is discharged having been sentenced by a court martial or civil power to penal servitude? Who is the competent officer to authorize and confirm the discharge?

(2) What are the regulations with regard to transfer to the R.A.M.C. at Stations abroad?

(3) What becomes of the regimental conduct sheets of soldiers who proceed on active service? By what means are fresh entries recorded in such documents?

(4) In what documents should the following records be entered:—
(*a*) Awarded 1st Class Certificate of education.
(*b*) Admission to hospital on account of alcoholism.
(*c*) Promotion to serjeant.
(*d*) An act of distinguished conduct.

(5) Under what conditions is service forfeited and how can it be restored?

Para. 284. b. 2.

(1) When a soldier, on the married establishment, is separated from his family owing to his serving abroad, what stoppages can be made from his pay in order to support them? How is the stoppage adjusted, should the man incur a forfeiture of pay?

(2) What are the purchase rates for discharge under the following conditions:—
(*a*) Under twelve years' service—soldiers in receipt of service pay on discharge from the Colours.
(*b*) After completing twelve years' service.
(*c*) All other soldiers.

(3) Under what circumstances can a private of the R.A.M.C. be reverted to a lower rate of Corps pay and how is this carried out?

(4) What procedure is adopted when a man wishes to remit money to the Post Office Savings Bank, England, through his account?

(5) A Special Reservist comes up for fifteen days' training on Monday, August 4. What entries will be and are likely to be made on his account in the Pay and Mess Book?

SERJEANTS.

Para. 283, b. 1.

(1) A company moving in company column encounters the following obstacles:—

(1) A ditch and bank.

(2) A narrow gate.

What are the various methods of passing these obstacles? Give in each case the appropriate words of command for passing these obstacles and re-forming into company column on the other side.

(2) Give the detail for forming fours and re-forming two deep by a squad: (1) When in line at the halt; (2) when in file on the march.

(3) State the length of the pace in (1) slow time; (2) quick time; (3) stepping out; (4) double time; (5) stepping short, and (6) side step.

(4) If a squad has been ordered to halt or mark time when a part of the fours only have wheeled, how will the remainder proceed?

Para. 283, b. 2.

(1) Give the words of command required to change a line of stretcher squads into column of squads, and the necessary detail to carry out the movement.

(2) Three stretcher squads are advancing with closed stretchers, when they receive the order to extend to four paces from No. 1 squad. No. 1 squad consists of four bearers, No. 2 of five, and No. 3 of six bearers. Describe the movement of the Nos. 2, 4, 5 and 6 bearers of each squad respectively.

(3) A stretcher squad is loading an upper compartment of an ambulance wagon and the stretcher has been pushed so far home that the patient's hips are in line with the tail board. Describe tbe further steps necessary to complete the movement.

(4) What precautions should be observed in using vehicles from civilian sources for ambulance purposes?

Para. 283, b. 3.

(1) May a soldier be placed under stoppages for private debt? State all you know of the regulations on this matter.

(2) What are the instructions with regard to gambling or book-making in garrisons or camps?

(3) Who is responsible to the C.O. for the discipline of the serjeants' mess? (1) generally; (2) on any particular occasion.

(4) What are the conditions under which soldiers are allowed to give gymnastic exhibitions at local fêtes?

Para. 283, b. 4.

(1) When hand pumps (fire) are specially authorized, what is there to indicate where they are to be kept in barracks? What provision is there for the supply of water in emergency?

(2) What inventories are kept in barrack rooms? What objects do these inventories serve, and what are the regulations regarding alterations or additions to inventories?

(3) State the procedure in making out a sick report. Where is this document ultimately filed?

(4) What are the duties of a commander of a guard (*a*) with regard to stores; (*b*) turning out the guard?

Para. 283, b. 5.

(1) As N.C.O. in charge of sanitary police, you are detailed to lay out and make latrines on the short and shallow trench system for a camp of 200 men for a stay of thirty days. How would you proceed?

(2) You are in charge of a small party billeted on the line of march. Who is responsible for making the necessary payments and whence is the money obtained? If the amount supplied is insufficient what steps are taken?

(3) What are the rules with regard to troops paying compliments: (1) On the march; (2) on service, and (3) on manœuvres?

(4) You are detailed as N.C.O. in charge of transport, what are your duties?

Para. 283, b. 6.

(1) What are the regulations laid down for the transfer of a general duty private to the nursing section?

(2) What is the duty of a clerk to the officer in charge of a military hospital with reference to the postage book?

(3) How is food drawn for a patient on the day of admission and the day of discharge?

(4) What are the regulations with regard to mental attendants giving information of patients' condition to their friends?

Corporals.

Para. 280, e. 1.

(1) What are the different forms of passes and what are the rules under which they are granted?

(2) What is the maximum punishment of C.B. which a commanding officer can inflict, and what does it entail when given to a private R.A.M.C.?

(3) A soldier acquires some information of a professional character while employed on duty, to whom does the information belong and how may he publish it?

Para. 280, e. 2.

(1) What are the duties of the N.C.O. in charge of the company messing book?

(2) You are wardmaster on duty, what steps would you take if the "fire alarm" was given by one of the patients in a ward?

(3) What are the regulations with regard to the employment of a guard or picket:—

(*a*) In assisting civil authorities.

(*b*) For the apprehension of soldiers.

Para. 280, e. 3.

(1) Mention the four methods of purification of water and state briefly the advantages and disadvantages of each.

(2) (*a*) Give the interval for tents as regards:—

(1) Each other.

(2) Between units.

(3) Between companies.

(*b*) Describe any improvised camp incinerator described in R.A.M.C. training.

(3) What sanitary organization does a field unit possess? Name its principal duties.

Para. 280, e. 4.

(1) What are the rules affecting the management of cooking stoves and metal kitchen utensils?

(2) How long does an orderly of the nursing section remain on night duty? At what times of the night does he get his meals? What relaxation is permitted?

(3) How does a patient in hospital obtain the following articles:—

(*a*) Tobacco.

(*b*) Any necessary kit.

Para. 280, e. 5.

(1) You are a N.C.O. in charge of some stretcher squads searching the battlefield for wounded after an action. You carry a surgical haversack. You find a man suffering from compound fracture below the knee (bullet wound). How would you direct his removal?

(2) Describe the various ways of using poles and a blanket for carrying a wounded man. Why are they unsuitable for carrying serious cases?

(3) Describe how a wounded man may be carried off the field by means of putties.

Para. 280, e. 6.

(1) What is meant by (*a*) primary, (*b*) reactionary, (*c*) secondary hæmorrhage.

(2) A man is brought in with a penetrating wound of the abdomen in the region of the liver. What would you do whilst waiting the arrival of a medical officer?

(3) Give some examples of systemic poisons. What are the symptoms and treatment in a case of poisoning by opium?

Para. 280, e. 7.

(1) Hot air is lighter than cold air. How is this fact made use of in the ventilation of wards?

(2) Why is thorough ventilation necessary in a ward? Suppose the number of patients in a ward were doubled, would they suffer and why?

(3) In carrying out ventilation what natural properties of air must be borne in mind?

Para. 280, e. 8.

(1) Describe fully the apparatus employed in:—

(*a*) The treatment of syphilis by the injection of mercurial cream.

(*b*) The treatment of gonorrhœa by irrigation.

(2) What means has a medical officer at his disposal in the medical companion for the treatment of malaria, fainting attack, to allay pain, arterial bleeding, retention of urine, and constipation?

(3) Describe and enumerate the instruments and appliances necessary for operating on a wound of the brachial artery.

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF JULY, AUGUST, AND SEPTEMBER, 1913.

Title of Work and Author	Edition	Date	How obtained
Proceedings of the Second All-India Sanitary Conference held at Madras, November 11 to 16, 1912. Vol. iv: Engineering		1913	Editor, Journal.
Proceedings of the Third Meeting of the General Malaria Committee held at Madras, November 18 to 20, 1912		1913	Commandant's Office.
Metropolitan Water Board. 9th Research Report. By Dr. A. C. Houston		1913	Dr. A. C. Houston.
Tuberculin Treatment. By Clive Riviere and Egbert Morland	2nd	1913	Editor, Journal.
The Medical and Surgical Uses of Electricity. By A. D. Rockwell		1907	Library Grant.
The Pathology of Growth Tumours. By C. P. White		1913	Editor, Journal.
Royal Commission on Tuberculosis. Final Report. Part 2. Appendix. Vol. vi		1913	Commandant's Office.
The Cancer Hospital Research Institute. Selected Papers. Vol. i		1913	,, ,,
The Protein Element in Nutrition. By Major D. McCay, I.M.S.		1912	Library Grant.
Practical Bacteriology, Microbiology and Serum Therapy (Medical and Veterinary). By Dr. A. Besson. Translated by H. J. Hutchens, D.S.O.		1913	,, ,,
Caisson Sickness and the Physiology of Work in Compressed Air. By Leonard Hill, M.D., F.R.S.		1912	,, ,,
Surgical Pathology and Morbid Anatomy. By Sir Anthony A. Bowlby, C.M.G., and Dr. F. W. Andrewes	6th	1913	,, ,,
Malingering and Feigned Sickness. By Sir John Collis, M.D. Assisted by A. H. Spicer, M.B.		1913	,, ,,
Milk and the Public Health. By W. G. Savage, M.D.		1912	,, ,,
Diseases of the Liver, Gall-bladder and Bile-ducts. By H. D. Rolleston, M.A., M.D.		1912	,, ,,
A Manual of Bacteriology. By R. S. Hewlett, M.D.	4th	1911	,, ,,
Anaphylaxis. By Charles Richet. Translated by J. M. Bligh, M.D. With a Preface by T. R. Bradshaw, B.A., M.D.		1913	,, ,,
The Sanitary Officer's Handbook of Practical Hygiene. By Beveridge and Wanhill	2nd	1912	,, ,,
Insanity and Allied Neuroses. By Sir G. H. Savage, M.D., and E. Goodall, M.D.		1912	,, ,,
Manual of Pathology. By W. M. Coplin, M.D. ..	5th	1912	,, ,,
The Operations of War, Explained and Illustrated. By General Sir E. B. Hamley, K.C.B., K.C.M.G. A New Edition by Brigadier-General L. E. Kiggell, C.B.		1909	,, ,,
Manual of Tropical Medicine. By Castellani and Chalmers	2nd	1913	,, ,,
A Handbook of the Diseases of the Eye and their Treatment. By Swanzy and Werner	10th	1912	,, ,,
The Invasions of England. 2 vols. By Capt. H. M. Hozier		1876	,, ,,
Diseases of the Gall-bladder and Bile-ducts, including Gall-stones. By A. W. Mayo Robson and J. F. Dobson	3rd	1904	,, ,,

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Text-Book of General Pathology. Edited by M. S. Pembery and J. Ritchie		1913	Library Grant.
Service Chemistry. By Lewes and Brame	4th	1913	,, ,,
On War. By General Carl von Clausewitz. Translated by Col. J. J. Graham. New and Revised Edition. With Notes by Col. F. N. Maude, C.B. 3 vols.		1911	,, ,,
Applied Physiology. By Robert Hutchison, M.D.		1909	,, ,,
Modern Theories of Diet. By A. Bryce, M.D. ..		1912	,, ,,
Surgery, its Principles and Practice. By Various Authors. Edited by W. W. Keen, M.D. Vol. vi		1913	,, ,,
The Elements of Bacteriological Technique. By J. W. H. Eyre, M.D.	2nd	1913	,, ,,
Tumours of the Jaws. By C. L. Scudder, M.D. ..		1912	,, ,,
Food Inspection and Analysis. By A. E. Leach. Revised by A. L. Winton	3rd	1913	,, ,,
A Manual of Clinical Chemistry, Microscopy, and Bacteriology. By Klopstock and Kowarsky		1912	,, ,,
Surgical After-treatment. By Crandon and Ehrenfried	2nd	1912	,, ,,
Surgery of the Brain and Spinal Cord. By Prof. F. Krause, M.D. English Adaptation by Dr. Max Shorek. Vols. ii and iii		1911	,, ,,
A System of Syphilis. Edited by Power and Murphy. Vols. iii, v, and vi		1909-11	,, ,,
Ionic Medication. By H. Lewis Jones, M.D. ..		1913	Editor, Journal.
1870-71. Erinnerungen und Betrachtungen. Von Prof. Dr. Heinrich Fritsch		1913	,, ,,
Aids to Surgery. By Joseph Cunning, M.B. ..	3rd	1913	,, ,,
Surgery of the Lung. By Garrè and Quincke. Translated by D. M. Barcroft, M.D.	2nd	1912	,, ,,
Précis de Radiologie Pratique. Par A. Lomon and C. Hahn		1913	Library Grant.
Abwehrfermente des tinischen Organismus. Von Emil Abderhalden	2nd	1913	,, ,,
The Bradshaw Lecture on the Diagnosis and Treatment of Incipient Pulmonary Tuberculosis. By D. B. Lees, M.D.		1913	Editor, Journal.
Orthopædics in Medical Practice. By Prof. A. Lorenz and Dr. A. Saxl. Translated by L. C. P. Ritchie, M.D.		1913	,, ,,
Principes Anciens Tactique Moderne		1912	Library Grant.
Culture Physique et Cures d'Exercice. Par Dr. F. Heckel			
Die Kaiser Wilhelms-Akademie für das Militärärztliche Bildungswesen. Von 1895 bis 1910			Presented by Major R. W. H. Jackson, R.A.M.C. (Ret.).
London Public Health Administration. By W. McC. Wanklyn, B.A.		1913	Presented by the Author.
Reports on Bilharzia		1903-12	Commandant's Office.
Australian Institute of Tropical Medicine. Report for the year 1911. By A. Breinl, M.D.		1913	Editor, Journal.
Collected Papers from the Research Laboratory. Parke, Davis and Co., Detroit, Mich. Reprints. Vol. i		1913	,, ,,

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Der Unterleibstyphus. Von Weil Dr. H. Curschmann. 2nd Edition. Edited by Dr. H. Curschmann and Prof. Dr. C. Hirsch		1913	Library Grant.
Die Sanitätsausrüstung des Heeres im Kriege. Von Dr. W. Niehues		1913	,, ,,
Die Schussverletzungen. Von Dr. Schjerning, Dr. Thöle, und Dr. Voss		1913	,, ,,
United States Department of Agriculture. 28th Annual Report of the Bureau of Animal Industry for the Year 1911		1913	Editor, Journal.
Epidemic Infantile Paralysis. By Prof. Paul H. Römer. Translated by H. R. Prentice, M.B.		1913	,, ,,
How to Diagnose Small-pox. By W. McC. Wanklyn, B.A.		1913	,, ,,
St. Thomas's Hospital Reports. New Series. Vol. xl		1913	,, ,,
Practical Physiological Chemistry. By Sidney W. Cole, M.A.	3rd	1913	,, ,,
The Reduction of Domestic Flies. By Edward H. Ross		1913	,, ,,
Tuberculin in Diagnosis and Treatment. By Bandelier and Roepke	2nd	1913	,, ,,
Clinical Laboratory Methods. By A. S. Morris, A.B., M.D.		1913	,, ,,
Acute Abdominal Diseases. By Joseph E. Adams, M.B., and Maurice E. Cassidy, M.D.		1913	,, ,,
Clinical Surgical Diagnosis. By F. de Quervain. Translated by J. Snowman, M.D.		1913	,, ,,
Traité Pratique de Bacteriologie. Vol. ii. Par E. Macé	6th	1913	Library Grant.
Das Blutbild und seine klinische Verwertung. Von Dr. V. Schilling-Sorgan		1912	,, ,,
Index Medicus. Vol. i, 1903, to Vol. v, 1907, Vol. x, 1912			,, ,,
The British Army, 1783-1802. By the Hon. J. W. Fortescue		1905	,, ,,
Gall-stones and their Surgical Treatment. By B. G. A. Moynihan, M.S.	2nd	1905	,, ,,
Annual Report of the Sanitary Commissioners with the Government of India for 1911		1913	Commandant' Office.
Report on Manœuvres held in Aldershot Command for the Training of certain Royal Army Medical Corps Units, August 13 to 15, 1912		1913	Commandant's Office
Extracts from the Report of the General Officer Commanding Northern Army, on the Medical Manœuvres held in the 2nd (Rawalpindi) Division in March, 1913			,, ,,
Seventh Annual Report Metropolitan Water Board. Report on the results of the Chemical and Bacteriological Examination of the London Water, for the twelve months ended March 31, 1913. By Dr. A. C. Houston		1913	Dr. A. C. Houston.
Board of Education. Reports for the Year 1911-1912, from those Universities and University Colleges in Great Britain which are in receipt of a Grant from the Board of Education. 2 Vols.		1913	Editor Journal.

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Fifty-fifth Annual Report of the Board of Superintendence of the Dublin Hospitals, for 1912-1913		1913	Editor, Journal.
Preventive Medicine and Hygiene. By Milton J. Rosenau		1913	,, ,,
The Examination of Waters and Water Supplies. By John C. Shush, M.D.	2nd	1913	,, ,,
Proceedings of the Second All-India Sanitary Conference held at Madras, November 11 to 16, 1912. Vol. 2. Hygiene		1913	,, ,,
Influence of Thermal Environment on the Circulation and the Body Heat. By Edgar R. Lyth, M.B.		1913	,, ,,

ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, OCTOBER 15, 1913, AT 3 P.M.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., D.G.A.M.S., President, in the chair.

Surgeon-General W. Babtie, V.C., C.B., C.M.G.
Colonel Sir James Clark, C.B., Bart.
Colonel B. Skinner, M.V.O.
Colonel E. H. L. Lynden Bell.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel A. B. Cottell.
Major E. M. Pilcher, D.S.O.

Letters of apology for absence were read from Colonel J. Lane-Notter and Colonel W. H. Horrocks.

(1) The minutes of the last meeting were read and confirmed.

(2) With reference to Minute 4 of the last meeting, the Committee discussed the proof copies of the revised rules and appointed a sub-committee, consisting of Colonel B. Skinner, Lieutenant-Colonel E. M. Wilson, and the Secretary, to revise the proofs. It was further resolved to have 1,500 copies printed with a view to forwarding a copy to every officer of the Corps through the administrative officers of commands, as it was the general opinion of the Committee that the number of subscribers would be increased by so doing.

October 16, 1913.
124, *Victoria Street, S.W.*

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON WEDNESDAY, OCTOBER 15, 1913, AT 2.30 P.M.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., D.G.A.M.S., in the chair.
Surgeon-General W. Babtie, V.C., C.B., C.M.G.
Colonel Sir James Clark, C.B., Bart.
Colonel B. Skinner, M.V.O.
Colonel E. H. L. Lynden Bell.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major E. M. Pilcher, D.S.O.
Captain L. Cotterill.
Captain T. J. Wright.

A letter of apology for absence was read from Captain F. Crookes.

(1) The minutes of the last meeting were read and confirmed.

(2) It was noted that the following grants have been received from Companies for the General Relief Fund during the past quarter:—

No. 6 Company,	Portsmouth	... ...	£5	0	0
,, 9 ,,	Colchester	... ...	2	2	0
,, 10 ,,	Chatham	... ...	1	0	0
,, 12 ,,	Woolwich	... ...	10	0	0
,, 14 ,,	Dublin	... ...	5	0	0
,, 16 ,,	Cork	... ...	3	0	0
,, 17 ,,	Curragh	... ...	4	0	0
,, 18 ,,	Rochester Row	... ...	2	0	0
,, 20 ,,	Tidworth	... ...	10	10	0
,, 27 ,,	Hong Kong	... ...	2	0	0
,, 28 ,,	Gibraltar	... ...	3	0	0
Camp of Instruction,	Longmoor	... ...	15	0	0
	Total	... ...	£62	12	0

(3) A sum of £22 15s. was sanctioned for grants made from the General Relief Fund during the past quarter; a list of recipients is appended to these proceedings.

(4) The Aldershot Band accounts were considered and passed, and are attached hereto. A grant of £90 was made for the current quarter's expenses.

(5) A letter from the manager of the Ex-Soldiers' Employment Agency, Newcastle-on-Tyne, requesting a subscription was considered. It was decided to refuse the application as the National Association for the Employment of Discharged Soldiers, to which the Fund subscribes, has already a branch in that town.

(6) A letter from the Secretary of the Royal Soldiers' Daughters' Home, stating that Girl L. had been dismissed from the school was noted.

(7) A letter was read from the Commandant of the Royal Army Medical College asking that the Fund should in future pay the fire insurance premiums of all memorials erected in the charge of Queen Alexandra's Military Hospital. After discussion it was resolved that the Fund shall undertake the cost of insuring all memorials erected in the chapel subject to an annual review at the April Meeting.

(8) A sum of 13s. was sanctioned as a special case to be paid from the General Relief Fund to Lieutenant-Colonel E. M. Wilson, towards the maintenance of child Wilton, whose mother, a subject of relief, recently died.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*
Secretary.

October 16, 1913.
124, *Victoria Street, S.W.*

STATEMENT OF THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS

JULY 1 TO SEPTEMBER 30, 1913.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Officers' (Aldershot) Subscriptions	23	17	6	Debit at Bank	12	8	5
Quarterly Grant, R.A.M.C. Fund	110	0	0	Bandmaster's Salary	30	0	0
One Officer's Subscription	0	5	0	Band Pay	50	14	7
				Refund, Major Thorpe's subscription, 1912-13	0	10	0
				Hawkes and Son (Music and Repairs)	13	13	7
				,, ,, (New Pouch Badges)	6	4	6
				,, ,, (Six Acetylene Lamps)	2	8	6
				Boosey and Co. (Music and Repairs)	0	19	0
				Master Tailor	2	3	3
				Stationery and Printing	1	16	9
				Electric Light	0	9	8
				Balance Credit at Bank	12	14	3
	£134	2	6		£134	2	6

Audited and found correct (Signed) H. A. HINGE, *Major R.A.M.C.*, *President*.
J. L. RITCHIE, *Lieutenant R.A.M.C.* } *Members*.
JOHN M. ROWE, *Lieutenant R.A.M.C.* }

Aldershot, *October* 13, 1913.

LIST OF RECIPIENTS OF GENERAL RELIEF FOR THE QUARTER ENDING SEPTEMBER 30, 1913.

Name	Age	District	Grant	Total	Remarks
Mrs. M. A. L.	31	London	£4	£10	Suffers from rheumatism; one child.
Mrs. M. J. S.	46	Aldershot	3	3	Destitution.
Pte. C. T.	28	,,	35s.	35s.	To enable parents to see their son seriously ill in hospital.
Mr. G. B.	52	London	£2	£2	Partial Destitution.
Mr. F. T. M.	33	Tidworth	4	4	Suffers from tubercle.
Mrs. M. E. T.	28	Woolwich	4	4	Destitution.
Mrs. A. L.	50	Cork	4	40	Destitution; ill-health.
		Total	£22 15s.		

ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND.

THE Quarterly Meeting of the Committee was held at the War Office on October 15, 1913.

Present.

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., President, in the chair.
Surgeon-General W. S. M. Price, Vice-President.
Deputy Surgeon-General W. G. Don, Vice-President.
Lieutenant-Colonel A. F. S. Clarke.
Lieutenant-Colonel T. W. Gibbard.
Lieutenant-Colonel S. Guise Moores.
Major C. E. Pollock.

The minutes of the previous meeting were confirmed.

The death was reported, on September 8, of Mrs. J. C. Deeble, a first-class annuitant.

Colonel James Maher was admitted a married member from September 1, 1913.

Lieutenant Robert Davidson was admitted an unmarried member from August 8, 1913.

The payment of annuities according to lists which were submitted was sanctioned; as was the withdrawal of £550 from deposit with the National Debt Commissioners for payment of annuities on the old account.

The payment of the Secretary's salary and office allowance for the quarter ended September 30, 1913, was sanctioned; also refund to him of petty cash expended.

The proceedings closed with a vote of thanks to the Chair.

J. T. CLAPHAM, *Captain.*
Secretary.

ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

THE following officers have been nominated as their representatives by messes abroad:—

Bangalore.—Major E. T. Inkson, V.C.
Lucknow.—Captain T. B. Moriarty.
Peshawar.—Captain C. T. Edmunds.
Rawal Pindi.—Captain W. Benson.
Cairo.—Major M. H. G. Fell.
Roberts' Heights.—Captain W. Mathieson.

A meeting of the Committee will be held at the R.A.M. College on Monday, November 10, at 2.15.

Agenda.

To report the resignation of Major Douglas Lawson, who is proceeding abroad, and to elect a chairman in his place.

To read letters from the Honorary Secretary of the late R.A.M.C. Mess, Tempe, on the proposed transfer of the balance of the funds of that mess, and of various articles of mess property, to the Central Mess Fund.

To consider the advisability of joining contributions to messes in the case of subscribers to the Central Fund being paid by this Fund either wholly or in part.

To consider whether a grant should be made to the Peshawar Mess to help it to recover from losses by burglary.

To consider the question of assistance to the Rawal Pindi Mess in paying off debentures.

Notes on Games.

Cricket.—No record has hitherto appeared in the Journal of the brilliant performance of Major H. B. Fawcus in the Army *v.* Navy Match last June. The following comment is from the *Times*:—

"Mention must be made of the remarkable bowling of Major H. B. Fawcus, who took nine wickets for 32 runs. He is fortunate in being able to make the ball swing in from the off exceptionally late in its flight. With a new ball and with the wind in the right direction he must be one of the best "swinging" amateur bowlers of the day for a few overs, and his astonishing success on the first day of this match certainly seemed to have had a demoralizing effect on the Navy batsmen yesterday, for even when his swing had left him they continued to treat him with the utmost respect."

His analysis read—

	O.	M.	R.	W.
First innings	9·5	3	11	5
Second innings	17·1	7	21	4

On October 5 a combined R.A.M.C. and A.O.C. team won the inter-regimental cricket challenge cup at Tidworth. The Corps was represented by Majors Addams-Williams and Cowey, Captains Ainsworth and Meadows, and Corporal Cowx.

Association Football.—The Aldershot team have started the season well in the Command Senior League, as reported in the *Sportsman*:—

"The R.A.M.C. smart forward line gave the 1st Royal Berkshire Regiment a big shock when they scored six goals before the interval and five afterwards, and but for Private Hilsdon's goal-keeping would have doubled it. A forward line which included four crack runners, amongst them Corporal Prince, the Army half-mile champion, and good footballers with it, requires some holding, and the Berkshires, with three changes from last season's team, were incapable of doing this. Gilham (outside right) failed to score, but he had a big share in the goals, which were credited as follows: Prince (6), Osborne (3), Veitch, and Morris."

In the first round of the Army Challenge Cup Competition the Aldershot team beat the 1st Battalion Scots Guards by three goals to one.

Rugby Football.—Lieutenants J. L. Huggan and R. C. Carlyle have been playing for the London Scottish, and R. Hemphill for the United Services.

The Honorary Secretary would be glad to receive any notes on games which are not sent to the Journal under the head of local news from the various stations. In order to appear in the next number they should reach him not later than the 18th of the month.

J. T. Clapham, *Captain*,
Hon. Sec.

UNITED SERVICES MEDICAL SOCIETY.

The next meeting of the above Society will be held at the Royal Naval Medical College, Greenwich, on Thursday, November 13, at 5 p.m. Business: "Tubercle in the Navy," by Surgeon Campbell Ross, M.B., R.N.

Staff-Surgeon Adrian Forrester, R.N.
Captain G. A. D. Harvey, R.A.M.C. } *Joint Hon. Secretaries.*

ROYAL COMMISSION ON SYPHILIS.

WITH reference to the appointment of the Royal Commission to inquire into the subject of venereal diseases in the United Kingdom, announced in the Press on October 29, 1913, it is understood that the question of the representation of the Naval and Military Forces of the Crown was fully considered, but in view of the fact that the subjects to be investigated are in the main civil rather than military, it was held that the interests of these Forces would be quite adequately and more properly represented by evidence than by a place on the Royal Commission.

LONDON UNIVERSITY INTELLIGENCE.

A SERIES of three special lectures on military subjects has been arranged for the present term by the Military Education Committee under the authority of the Senate of the University. The first will be given by Brigadier-General H. H. Wilson, C.B., D.S.O., Director of Military Operations at the War Office, at the University on Wednesday, November 5, at 5.30, on "Frontiers with Special Reference to those in Europe." The other two lectures will be delivered by Lieutenant-Colonel the Hon. G. H. Morris, Commanding 1st Battalion Irish Guards, on "Night Operations," on November 26, and by Brigadier-General J. E. Gough, V.C., C.M.G., A.D.C., Brigadier-General, General Staff, Aldershot Command, on "Counter Attacks," on December 17. Admission is free, without ticket.

WARRANT OFFICERS' AND SERJEANTS', PAST AND PRESENT, ANNUAL DINNER CLUB.

A MEETING of the Committee will be held in London during the month of November (time, date and place will be notified, to those concerned, later).

Any suggestion in connection with the Sixth Annual Dinner should be sent to a member of the Committee or to the Secretary early, when it will be fully discussed.

Subscriptions are now due up to and for March 31, 1914, and in order to minimize clerical labour on the night of the dinner, and to enable the committee to make suitable arrangements, it is hoped that members will assist materially by forwarding their subscriptions early.

The following have joined or rejoined since last dinner: Quartermaster and Hon. Captain Pilgrim; Serjeant-Major Escott; Staff-Serjeant Barlow; Serjeants Blair, Griffin, Freeman, Rouse, Littleworth, Blundell, Baker, Medland, Bartlett, Howlett, Marsden, and Harlen; Messrs. Boxall, Bamber, and Hunt.

The Committee much regret to notify the death of Mr. L. E. W. Tempest, late Staff-Serjeant, one of our earliest members.

All communications, &c., to Fred G. Court, Staff-Serjeant, Hon. Sec., R. Herbert Hospital, Woolwich.

OBITUARY.

DEPUTY SURGEON-GENERAL NATHANIEL NORRIS.

DEPUTY SURGEON-GENERAL N. NORRIS died at Chester, on September 29, 1913, aged 80. He was born at Eastham, Cheshire, October 16, 1832. He was appointed an Acting Assistant Surgeon, April 2, 1855; Assistant Surgeon Staff, February 26, 1856; 85th Foot, December 31, 1858; Rifle Brigade, July 7, 1861; Staff, August 8, 1862; 41st Foot, March 14, 1865; Surgeon Staff, April 1, 1868; 90th Foot, November 7, 1868. Became Surgeon-Major, A.M.D., April 1, 1868, under the provisions of the Royal Warrant of March 1, 1873; Brigade-Surgeon January 9, 1881. He retired with the honorary rank of Deputy Surgeon-General, June 24, 1885. His War Service was: Jowaki Expedition, 1877-78; medal with clasp. Afghan War, 1878-80; medal. Soudan Expedition, 1884-85; Nile. Field Medical Inspector on Lines of Communication. Medal with clasp; bronze star.

LIEUTENANT-COLONEL JOHN RITCHIE.

LIEUTENANT-COLONEL J. RITCHIE died on October 6, in a nursing home at Glasgow, as a result of injuries received through falling over an embankment at Blantyre Priory while searching for botanical specimens. Lieutenant-Colonel Ritchie was born at

Uddington, Warwick, in 1862, and was educated at Glasgow University, where he took the M.B., C.M. degree in 1884. He entered the Army as Surgeon, Medical Staff, on February 5, 1887, became Major Royal Army Medical Corps in February, 1899, and was promoted Lieutenant-Colonel on July 29, 1911.

He served in Malta from August 15, 1889, to October 29, 1895. In July, 1897, he proceeded to Sierra Leone, and took part in the operations in the Northern Territories Gold Coast in 1898, for which he received the clasp, and also in the operations in Sierra Leone, 1898-99, receiving the medal and clasp. He next took part in the South African War, from 1900 to 1902, and was present at the operations in the Orange Free State, April and May, 1900; the operations in the Transvaal, May and June, 1900, including the actions near Johannesburg, Pretoria and Diamond Hill; the operations in the Orange River Colony, May, 1900, to March, 1901, including the actions at Wittebergen, July 1 to 29; the operations in Cape Colony, south of Orange River, 1900; the operations in the Transvaal, March, 1901, to May, 1902. He received the Queen's medal with four clasps, and the King's medal with two clasps.

He also served in Singapore and latterly in India. He contributed a paper on the "Fevers of West Africa" to *The Glasgow Medical Journal*, in 1898, one on "Personal Experiences in the South African War," in 1903, and one on "The Evolution of the Medical Practitioner," 1905, to *The Journal of the Malay Branch of the British Medical Association.*

MAJOR HERBERT CUMMING FRENCH.

Major H. C. French died on October 13, 1913, aged 43. He was the son of Major General Sir George French, and was born in the province of Quebec, Canada. He received his medical education at King's College Hospital, where he had a brilliant career. In 1891 he was the resident Warneford scholar, and in the following year held a senior scholarship. He joined the Army as a Surgeon-Lieutenant Army Medical Staff, in 1893, became Surgeon-Captain in 1896, Major, Royal Army Medical Corps, in 1905, and received the higher rate of pay in 1913. He was awarded the Albert Medal of the second class, and the silver medal of the Royal Humane Society, for gallantry displayed in attempting to rescue a native fireman who had jumped overboard from H.M. Transport "Wakool" in the Straits of Malacca, on November, 1902, while the ship was steaming full speed. Major French served during the South African War in the Transvaal, and in the Orange River Colony, and was awarded the Queen's medal with two clasps.

In the service Major French will always be remembered by his labours to diminish the inefficiency caused by venereal disease amongst soldiers. He wrote many papers on the prevention and treatment of syphilis, and in 1907 published a book on "Syphilis in the Army." In 1912 he was appointed a Hunterian professor in the College of Surgeons, England. In 1913, only a few months before his death, he wrote a valuable paper on the "State Control of Syphilis," which was read before the International Medical Congress.

LIEUTENANT-COLONEL HENRY KNAGGS.

Lieutenant-Colonel H. Knaggs died at Cheltenham on October 13, aged 78 years, He received his medical education at Guy's Hospital and took the diplomas of M.R.C.S. England, and L.M., in 1857. He joined the Army as Assistant-Surgeon, Staff, April 24. 1858, was transferred to the 59th Foot on May 28, 1858, and to the Cape Mounted Rifles May 24, 1859; he rejoined the Staff on March 29, 1864. He was appointed Surgeon Army Medical Department, March 1, 1873, and promoted Surgeon-Major April 1, 1873, Brigade-Surgeon April 16, 1884. He retired May 5, 1888. His war service was: Bechuanaland Expedition 1884-5, in charge of Base Hospital. Honourably mentioned.

QUARTERMASTER AND HONORARY CAPTAIN JOHN BERESFORD CONOLLY, R.A.M.C.

Captain J. B. Conolly died on October 19, 1913, aged 49. He enlisted in the Army Hospital Corps on August 7, 1879, and received Her Majesty's Commission as Quartermaster and Honorary Lieutenant on March 7, 1900; he was promoted Captain, March 7, 1910. He served in the Soudan Expedition, 1885, and received the medal with clasp and bronze star. He also took part in the South African War during the years 1899-1902. He was present at the advance on Kimberley, including the actions at Magersfontein, Paardeberg (February 17 to 26), Poplar Grove and Dreifontein. He received the Queen's medal with three clasps and the King's medal with two clasps.

BIRTHS.

O'GRADY.—On October 3, at 52, Lower Mount Street, Dublin, the wife of Major Standish O'Grady, of a daughter.

COCHRANE.—On October 15, at Forman Manor House, Ash, Surrey, the wife of Major E. W. W. Cochrane, of a son.

DEATHS.

NORRIS.—On September 29, at Chester, Honorary Deputy Surgeon-General Nathaniel Norris, Brigade-Surgeon, retired, Army Medical Staff, aged 80.

RITCHIE.—On October 6, at Glasgow, Lieutenant-Colonel John Ritchie, Royal Army Medical Corps, aged 50.

FRENCH.—On October 13, at London, Major Herbert Cumming French, Royal Army Medical Corps, aged 43.

KNAGGS.—On October 13, at Cheltenham, Lieutenant-Colonel Henry Knaggs, retired, Army Medical Staff, aged 78.

CONOLLY.—On October 19, at Merton, Quartermaster and Honorary Captain John Beresford Conolly, Royal Army Medical Corps, aged 49.

EXCHANGES, &c.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

Number of Reprints	Number of Pages	Cost of Reprints	Cost of EXCERPTS *	Extra for Covers for Reprints: As Journal, Printed on Front	Extra for Covers for Reprints: As Journal, Plain, Unprinted	Extra for Covers for Reprints: Cheaper Paper, Printed on Front	Extra for Covers for Reprints: Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Surgeon-General P. M. Ellis, Major R. W. H. Jackson, Colonel R. H. Firth, Major W. H. Babington, Staff-Serjeant E. B. Dewberry, Major F. W. Lambelle, Lieutenant J. E. Hepper, Lieutenant C. M. Finny, Major W. S. Crosthwait.

The following publications have been received:—

British: Guy's Hospital Gazette, The Australasian Medical Gazette, The Journal of Tropical Medicine and Hygiene, The Indian Medical Gazette, The Army and Navy Gazette, The Hospital, The Practitioner, The Journal of State Medicine, Tropical Diseases Bulletin, Medical Press and Circular, The Shield, The Royal Engineers' Journal, Transactions of the Society of Tropical Medicine and Hygiene, The Army Review, The Lancet, St. Bartholomew's Hospital Journal, Memoirs of the Department of Agriculture in India, The Quarterly Journal of Medicine, The Indian Medical Journal, The Journal of Vaccine Therapy, Red Cross and Ambulance News, Bulletin of Entomological Research, The British Medical Journal, The Middlesex Hospital Journal, The Medical Review, Proceedings of the Royal Society of Medicine, The British Journal of Tuberculosis, The Army Service Corps Quarterly, Public Health, Bedrock, Journal of the Royal United Service Institution, The Cavalry Journal.

Foreign: The Journal of Infectious Diseases, The Military Surgeon, Russian Naval Medical Journal, Norsk Tidsskrift for Militaermedicin, Revista de Sanidad Militar, Le Caducée, Annales d'Hygiène et de Médecine Coloniales, Archiv für Schiffs- und Tropen-Hygiene, Deutsche Militärärztliche Zeitschrift, Bulletin de l'Institut Pasteur, Bulletin of the Johns Hopkins Hospital, Archives de Médecine et Pharmacie Navales, Office International d'Hygiène Publique, American Medicine, Bulletin de l'Institut Médecine.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c. are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

The Hon. Manager,
"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

DECEMBER, 1913.

ARMY MEDICAL SERVICE.

Colonel Tom P. Woodhouse, on completion of four years' service in his rank, is placed on the half-pay list, dated November 17, 1913.

Lieutenant-Colonel Henry N. Thompson. D.S.O., M.B., from the Royal Army Medical Corps, to be Colonel *vice* T. P. Woodhouse to half pay, dated November 17, 1913.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel James Will, M.B., is placed on retired pay, dated November 5, 1913.

Major Francis W. Begbie to be Lieutenant-Colonel *vice* H. N. Thompson, D.S.O., promoted, dated November, 17, 1913.

Major Edgar M. Pilcher, D.S.O., M.B., F.R.C.S., Professor of Military Surgery, Royal Army Medical College, to be Brevet Lieutenant-Colonel dated November 26, 1913.

The undermentioned majors retire on retired pay: Gerald S. Mansfield, M.B., dated October 4, 1913; Charles H. Hopkins, half-pay list, dated November 5, 1913; Frederick J. W. Porter, D.S.O., dated November 22, 1913.

Major Edmund P. Hewitt is placed temporarily on the half-pay list on account of ill-health, dated November 7, 1913.

The undermentioned Lieutenants are confirmed in their rank: Robert G. Shaw, M.B., Alexander L. Urquhart, M.B., Avenell F. C. Martyn.

Serjeant-Major Joseph Thomas Packard to be Quartermaster with the honorary rank of Lieutenant, dated November 12, 1913.

HIGHER RATE OF PAY.—Lieutenant-Colonels J. Fallon and A. R. Aldridge, C.S.I., have been selected for increased pay under Article 358 of the Royal Warrant for Pay and Promotion.

ARRIVALS HOME FOR DUTY.—From India: on October 30, Lieutenant-Colonel J. Girvin, Majors G. St. C. Thom and B. Watts, Captains J. J. O'Keeffe, C. P. O'Brien-Butler (by exchange), and C. Ryles; on November 8, Major J. S. Bostock (by exchange); on November 11, Majors E. W. Slayter and B. F. Wingate, Captains M. B. H. Ritchie, A. M. Benett, and T. W. Browne.

ARRIVALS HOME ON LEAVE.—Lieutenant-Colonels T. G. Lavie and C. H. Hale, D.S.O., Major St. J. B. Killery, Captains A. Hendry and T. H. Dickson.

POSTINGS.—Scottish Command: Major G. St. C. Thom. Western Command: Captain A. M. Benett. Aldershot: Major J. S. Bostock. Eastern Command: Captains M. B. H. Ritchie and J. J. O'Keeffe. Irish Command: Lieutenant-Colonel J. Girvin, Majors E. W. Slayter and A. W. N. Bowen, Captains T. W. Browne and C. P. O'Brien-Butler. London District: Majors B. Watts and B. F. Wingate. Alderney: Captain C. Ryles.

TRANSFERS.—To the Northern Command: Major J. E. Hodgson, from London; Captain D. E. Curme, from Aldershot. To Aldershot: Major S. de C. O'Grady, from the Tower of London; Captain W. Benson, from Woolwich. To the Eastern Command; Major J. H. Campbell, D.S.O., from London; Captain G. B. Edwards, from Halifax.

TRANSFERS TO THE HOME ESTABLISHMENT.—From India, on December 16, MajorA. W. N. Bowen.

APPOINTMENTS.—Lieutenant-Colonel J. Girvin, charge of the Military Hospital, Curragh. Major G. St. C. Thom, Deputy Assistant Director of Medical Services, Lowland Division, Territorial Force. Major J. H. Campbell, D.S.O., Medical Inspector of Recruits, Eastern Command. Major B. Watts, Sanitary Officer, London District. Major J. E. Hodgson, Sanitary Officer, Northern Command. Captain N. E. J. Harding, Medical Officer of the Tower of London. Captain W. Benson, Company Officer at the Depot, Royal Army Medical Corps.

Captain A. Irvine-Fortescue has been selected to proceed to Japan for a three years' course of study of the Japanese language.

RETIRED PAY APPOINTMENTS.—Major C. H. Hopkins, Medical Charge at Devizes.

QUALIFICATIONS.—The undermentioned officers have obtained the degrees, &c., noted against their names: Major S. L. Cummins, M.D., National University of Ireland; Captain K. Comyn, M.D., University of Cambridge.

ROSTER FOR SERVICE ABROAD. — Lieutenant-Colonel H. E. Winter has exchanged to a higher position on the roster with Lieutenant-Colonel G. A. T. Bray.

EMBARKATIONS.—For Mauritius: On November 1, Lieutenant H. R. L'Estrange; on November 15, Major D. Lawson. For India: on November 13, Majors H. W. H. O'Reilly and E. S. Clark, Captains T. S. Dudding and K. A. C. Doig, Lieutenants J. M. Elliott and F. R. B. Skrimshire; on November 21, Major J. C. Kennedy, Captains J. A. W. Webster and E. M. Pennefather, Lieutenants W. B. Laird, E. A. Strachan and H. W. L. Allott. For Egypt: On November 22, Lieutenant-Colonel N. Manders.

DECORATIONS.—The King has been pleased to give and grant unto the undermentioned officers, His Majesty's Royal licence and authority to accept and wear Decorations (as stated against their names), conferred upon them by His Highness the Khedive of Egypt, authorized by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by them: Fourth Class, Imperial Ottoman Order of the Osmanieh, Major John Powell, M.B., R.A.M.C. Fourth Class, Imperial Ottoman Order of the Medjidieh, Captain Richard James Campbell Thompson, R.A.M.C.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name		Date	Section	Remarks
9940	Qmr. Serjt.	Davis, F. ..	21.8.13	..	*Vice* F. J. Taylor, to pension.
10059	,, ,,	Carnell, G. W.	21.8.13	..	,, W. E. Eate, to pension.
11066	,, ,,	Lee, H. B. ..	1.9.13	..	,, H. Duff, to pension.
11141	,, ,,	Coggon, T. E...	12.11.13	..	,, J. T. Packard to H.M. Commission.

To be Quartermaster-Serjeants.

No.	Rank and Name		Date	Section	Remarks
10296	Staff-Serjt.	Bangert, H. A.	4.7.13	..	*Vice* C. W. France, to pension.
11082	,, ..	Fraser, J.	14.7.13	..	,, H. Muggleton to pension.
11303	,, ..	Ashton, R.	21.8.13	..	,, F. Davis, promoted.
12138	,, ..	Steele, H.	21.8.13	..	,, G. W. Carnell, promoted.
14008	,, ..	Watt, D.	1.9.13	..	,, H. B. Lee, promoted.
12522	,, ..	Gallie, S.	6.9.13	..	,, G. R. Baynes, to pension.
14505	,, ..	Jones, H.	6.9.13	..	,, S. Gallie, Supernumerary.

To be Staff-Serjeants.

No.	Rank and Name		Date	Section	Remarks
12623	Serjeant ..	Rolfe, H. S. ..	4.7.13	..	*Vice* H. A. Bangert, promoted.
11583	,, ..	McCarthy, W...	14.7.13	..	,, J. Fraser, promoted.
12732	,, ..	Hughes, F. ..	16.7.13	..	,, W. H. Jones, Supernumerary.
11565	,, ..	Jones, J. H. ..	21.7.13	..	,, P. D. Hyett, to pension.
12266	,, ..	Parker, H. ..	30.7.13	..	,, E. Heath, to pension.
16216	,, ..	Robinson, J. W.	30.7.13	..	,, H. Parker, Supernumerary.
12104	,, ..	Newton, J. E...	21.8.13	..	,, R. Ashton, promoted.
16265	,, ..	Simes, P. T. ..	21.8.13	..	,, H. Steel, promoted.
18149	,, ..	Godfrey, A. H.	1.9.13	..	,, D. Watt, promoted.
13338	,, ..	Boxshall, H. S.	1.9.13	..	,, A.H.Godfrey, Supernumerary.
16227	,, ..	Ashworth, J. ..	6.9.13	..	,, H. Jones, promoted.
14123	,, ..	Winn, H. ..	6.9.13	..	,, J. Ashworth, Supernumerary.
12155	,, ..	McKay, A. ..	6.9.13	..	,, H. Winn, Supernumerary.
16399	,, ..	Elliott, R. D...	21.9.13	..	,, W. Clilverd, to pension.
14958	,, ..	Soady, H. ..	26.9.13	..	,, C. H. Edwards, to pension.

To be Serjeants

No.	Rank and Name		Date	Section	Remarks
14735	Lce.-Serjt.	Cox, J. A. C. ..	16.7.13	Cooking ..	Special as High Class Cook, *vice* F. Hughes, promoted.
14668	,, ..	Amsden, A. ..	21.7.13	Nursing ..	*Vice* J. H. Jones, promoted.
16878	,, ..	McCraig, R. ..	28.7.13	Clerical ..	,, G. A. Folkes to pension.
17663	,, ..	Duerden, G. ..	30.7.13	Nursing ..	,, J. W. Robinson, promoted.
18973	,, ..	Abbott, J. J. ..	16.8.13	,, ..	,, J. Walsh, to pension.
12195	,, ..	Joyce, A. ..	18.8.13	Cooking ..	Special as High Class Cook, *vice*, J. McL. Forrester, deceased.
12986	,, ..	Alexander, E...	21.8.13	Nursing ..	*Vice* J. E. Newton, promoted.
17767	,, ..	Kimber, H. G.	21.8.13	,, ..	,, P. T. Simes, promoted.
16397	,, ..	Mills, W. G. ..	1.9.13	Cooking ..	,, H. S. Boxshall, promoted.
16474	,, ..	Lowery, W. ..	4.9.13	General Duty	,, W. Skinner, to Territorial Forces.
12088	,, ..	Wells, G. ..	6.9.13	,, ,,	,, G. Hinton, to Territorial Forces.
16982	,, ..	Medland, J. ..	6.9.13	,, ,,	,, A. McKay, promoted.
295	,, ..	Cheer, A. E. ..	21.9.13	,, ,,	,, R. D. Elliott, promoted.
18341	,, ..	Nettle, A. ..	26.9.13	Clerical ..	,, H. Soady, promoted.

To be Corporals.

19261	Lce.-Corpl.	Croft, A. T. ..	1.10.13	General Duty	To complete Establishment.
19038	,, ..	Floyd, H. W...		,, ,,	
19128	,, ..	Burr, W. G. ..		Nursing ..	
19211	,, ..	Bowen, G. ..		,, ..	
19234	,, ..	Thurgar, E. ..		General Duty	
19249	,, ..	Caste, J. ..		Nursing ..	
19391	,, ..	Walker, G. W.		Clerical ..	
19607	,, ..	Pottow, R. C...		Nursing ..	
1094	,, ..	Alloway, H. B.		,, ..	
1097	,, ..	Herbert, R. ..		Clerical ..	
19547	,, ..	Mansell, W. A.		Nursing ..	
925	,, ..	Lomas, C. ..		Clerical ..	
1116	,, ..	Lockwood, J. W.		Nursing ..	
2083	,, ..	Pearce, W. G...		,, ..	
11894	,, ..	Snow, R. ..		,, ..	
15435	,, ..	Parrish, T. ..		Clerical ..	
18736	,, ..	Franklin, E. C.		Nursing ..	
19140	,, ..	Price, J. ..		Cooking ..	

DISCHARGES.

10304	S.-Serjt.	Dearsley, A.	21.10.13	After 18 years' service.
9875	,,	Shaw, A. E.	28.11.13	Termination of second period.
12322	Corporal	Webster, W.	4.11.13	After 18 years' service.
2032	Private	Wood, R. R.	19.9.13	Payment of £18.
6955	,,	Treble, C. J.	9.9.13	,, ,,
10876	,,	Westell, G.	16.10.13	After 18 years' service.
14554	,,	Knight, H. C.	19.10.13	Termination of second period.
6240	,,	Dyer, H. J.	31.10.13	Medically unfit.
7095	,,	Dorling, J.	25.10.13	,, ,,
6903	,,	Higgins, F. C. M.	25.10.13	,, ,,
7047	,,	Redding, J. L.	14.11.13	,, ,,
5592	,,	Ness, A.	27.10.13	Payment of £18.
10109	,,	Ratcliff, E. J. H.	18.11.13	After 18 years' service.

TRANSFERS TO ARMY RESERVE.

5156	Pte.	Wilkie, W.	6.10.13	5189	Pte.	Smith, C. W.	24.10.13
5158	,,	Kennedy, P.	10.10.13	5191	,,	Boswell, E. H.	27.10.13
5148	,,	Leonard, D.	6.10.13	5184	,,	Rolls, J. A.	26.10.13
5152	,,	Spencer, H. A.	10.10.13	5185	,,	Collinge, H.	26.10.13
5153	,,	Cole, T.	11.10.13	5187	,,	Harper, G.	26.10.13
19921	,,	Shearer, G.	12.10.13	873	,,	Crook, W.	23.10.13
5163	,,	Davies, R. T.	13.10.13	904	,,	Dunn, J. J.	29.10.13
5169	,,	Durkin, J.	17.10.13	5192	,,	Turner, F.	28.10.13
846	,,	Dean, G. S.	17.10.13	5176	,,	Post, R. E.	18.10.13
5177	,,	Spirling, W.	19.10.13	5170	,,	Knott, H.	18.10.13
5174	,,	Wills, C.	19.10.13	918	,,	Nelson, W.	31.10.13
19929	,,	Lenton, B. C.	16.10.13	925	Cpl.	Lomas, C.	1.11.13
867	,,	Grogan, J. M.	21.10.13	5198	Pte.	Venner, F.	31.10.13
5181	,,	Fraser, J. A.	23.10.13	5195	,,	Savage, A.	31.10.13
5189	,,	Strugnell, W. W.	10.10.13	19971	,,	Biggins, E. J.	5.11.13
5160	,,	Cook, A. E.	10.10.13	5199	,,	Kitts, H. H.	2.11.13
5162	,,	Penny, B. N.	12.10.13	19975	,,	Lee, R. J.	9.11.13
880	,,	Grace, F. D.	23.10.13	5201	,,	Mungeam, H. J.	7.11.13
894	,,	O'Brien, W.	23.10.13	5208	,,	Percival, T. P.	8.11.13
5182	,,	Bannister, G.	24.10.13	953	,,	Ludlow, F. H.	12.11.13
5188	,,	Phipson, W.	27.10.13	957	,,	Hunt, H. A.	12.11.13
5190	,,	Clark, A.	27.10.13	946	,,	Legg, S.	11.11.13
5194	,,	Hall, J.	30.10.13	952	,,	Cheese, F. W.	12.11.13
5186	,,	Wood, H. G.	26.10.13				

TRANSFERS FROM OTHER CORPS.

10518	S.-Serjeant	Brice, E.	31.10.13	From S. of Ins., E. A. Divn. T.F., Ipswich.
7342	Lce.-Corpl.	Sweet, E. E.	3.10.13	,, "The Buffs."
7387	Private	Weeks, J. V.	4.11.13	,, 2nd Welsh Regt.
7388	,,	Hancox, P. J.	4.11.13	,, 2nd, K. R. R. C.

TRANSFERS TO OTHER CORPS.

10953	S.-Serjt.	Way, W. H.	19.10.13	To 4th L. F. Amb., R.A.M.C. T.F.
17521	Serjeant	Parsons, H. G.	29.10.13	,, S. of Ins., E. A. Divn. T.F., Ipswich.
6833	Private	Mead, E. R.	31.10.13	,, 19th Hussars.

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified :—

To be Lance-Serjeants.

No.	Rank and Name		Date	Section	Remarks
10191	Corporal ..	Moore, G. R. ..	1.10.13	Cooking ..	Special as High Class Cook
10887	,, ..	Humphrey, W. A.		,, ..	Special as High Class Cook
17454	,, ..	Allport, E. C. ..		Nursing ..	As Dispenser
17058	,, ..	Fayter, H. ..		General Duty	,,
11814	,, ..	Herington, A. E.		,, ,,	,,
14693	,, ..	Kay, F. W. ..		Cooking ..	,,
17390	,, ..	Cowx, R. ..		General Duty	,,
17513	,, ..	Gallivan, J. ..		Nursing ..	,,
15804	,, ..	Fitze, J.		Cooking ..	Special as High Class Cook
15538	,, ..	Jesson, E. H. ..		Nursing ..	As Dispenser
16442	,, ..	Lawson, W. ..		Cooking ..	Special as High Class Cook
17696	,, ..	Collins, S. ..		Nursing ..	As Dispenser
17726	,, ..	Murphy, C. P. ..		General Duty	,,
17727	,, ..	Wrigley, A. ..		Clerical ..	,,

To complete Establishment

To be Lance-Corporals.

2102*	Private ..	Catton, F. T. ..	1.10.13	Cooking ..	To complete Establishment.
12047	,, ..	Eley, H. A. ..		Nursing ..	
17517	,, ..	White, F. ..		General Duty	
18254	,, ..	Wright, A. W.		Nursing ..	
18907	,, ..	Blundell, W. J.		Superintending cook	
19171	,, ..	Smith, W. A. ..		Nursing ..	
19472	,, ..	Munson, C. E.		1st Class Clerk	
19583	,, ..	Pickerden, T. ..		,, ,,	
19591	,, ..	Rolfe, P. L. ..		General Duty	
19930	,, ..	Pickard, A. ..		,, ,,	
19938	,, ..	Wright, A. E...		1st Class Clerk	
19946	,, ..	Hillier, H. J. ..		Superintending Cook	
19960	,, ..	Grizzell, R. J...		General Duty	
19993	,, ..	Macaulay, W...		,, ,,	
19997	,, ..	Tilby, R. J. ..		1st Class Clerk	
5	,, ..	Meller, G. P. ..		Cooking ..	
17	,, ..	Berry, A. C. ..		1st Class Clerk	
22	,, ..	Church, W. R.		Superintending Cook	
26	,, ..	Bax, F. ..		1st Class Clerk	
29	,, ..	Hart, J. ..		Nursing ..	
42	,, ..	Harding, D. G.		,, ..	
50	,, ..	Wilson, H. ..		Cooking ..	
6714	,, ..	Barnard, D. ..		General Duty	
87	,, ..	Woodley, A. W.		Nursing ..	

* Special under para. 281, Standing Orders.

AWARD OF ARMY FORM C 344.

The undermentioned have been awarded A.F. C 344, on the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
1051	L.-Cpl.	Davey, W. H...	16.10.11	1688	Pte. ..	Drew, G. H. F.	1.8.13
4343	Pte. ..	Parr, W. S. ..	31.12.12	1865	,, ..	Johnstone, R...	1.8.13
4643	,, ..	Lillywhite, P...	17.5.13	1969	,, ..	Overton, G. W.	1.8.13
16678	Serjt.	March, J. E. ..	24.5.13	2013	,, ..	Connell, W. J.	1.8.13
12155	,, ..	McKay, A. ..	1.7.13	2054	,, ..	Berry, G. H. ..	1.8.13
4596	Pte. ..	Richards, G. R.	19.7.13	4737	,, ..	Hayles, H. D...	1.8.13
19236	Corpl.	Pettit, E. F. ..	30.7.13	2235	Corpl.	Walkley, T. ..	1.9.13
12592	Serjt.	Fraser, J. G. ..	1.8.13	5105	Pte. ..	Pawson, F. ..	5.9.13
19776	L.-Cpl.	Swan, G. ..	1.8.13				

ARMY FORM C 344.

The following is a list of successful candidates at the examination for A.F. C 344, held in May, 1913 :—

Corps No.	Rank and Name		Station	Percentage	Order of merit as regards number of marks awarded
5328	Private ..	Maydon, F.	London ..	·93	1
5281	,, ..	Jerred, A.	Devonport ..	·91	2
14761	Serjeant ..	Robertson, W. ..	ConnaughtHosp.	·90	3
5214	Private ..	Stanford, E. R. ..	Devonport ..	·89	4
15671	Serjeant ..	Cole, R. W.	,, ..	·89	5
5105	Private ..	Pawson, F.	,, ..	·89	6
17928	Serjeant ..	Toye, W. S.	London ..	·88	7
19322	,, ..	Elliott, H.	York	·87	8
12155	,, ..	McKay, A.	Chatham ..	·87	9
4842	Private ..	Ricks, A. C.	Cosham ..	·86	10
4389	,, ..	Dedow, P. F... ..	Egypt	·86	11
4494	,, ..	Norris, A. L.	Gibraltar ..	·86	12
12129	Serjeant ..	Barnes, S. M... ..	London ..	·86	13
5025	Private ..	Parsons, E.	,, ..	·85	14
5151	,, ..	Francis, G. E. ..	Gibraltar ..	·83	15
18216	Serjeant ..	Leggett, R. G. ..	Cambridge Hosp.	·82	16
5260	Private ..	Bew, A. J.	ConnaughtHosp.	·82	17
4841	,, ..	Clarke, A. E.	Cork	·81	18
5098	,, ..	Smith, T. W... ..	ConnaughtHosp.	·80	19
5034	,, ..	Taprill, F.	London ..	·80	20
14538	Serjeant ..	Wells, H.	Gibraltar ..	·79	21
18385	,, ..	Coupland, F. W. ..	ConnaughtHosp.	·79	22
4894	Private ..	Crossman, W. G. ..	South Africa ..	·79	
2054	,, ..	Berry, G. H.	Malta	·79	23
5386	,, ..	Gray, F. A.	Chatham ..	·78	24
5128	,, ..	Dean, P.	ConnaughtHosp.	·78	25
5535	,, ..	Masters, C. H. ..	York	·78	26

ARMY FORM C 344.—*Continued.*

Corps No.	Rank and Name		Station	Per-centage	Order of merit as regards number of marks awarded
5241	Private ..	Hollier, F. C... ..	London ..	·77	27
934	,, ..	Giles, T.	Gibraltar ..	·77	28
2046	Corporal ..	Hammond, F. J. ..	Hong Kong ..	·77	
1393	Private ..	Vear, A.	Netley	·77	
11929	Serjeant ..	Cooper, W. J... ..	Curragh ..	·77	
14050	,, ..	Andrews, W.	South Africa ..	·77	29
5467	Private ..	Brown, H. A. W. ..	Cambridge Hosp.	·76	30
1798	,, ..	Gilbert, R. R. ..	Hong Kong ..	·76	31
5180	,, ..	Jones, W. J.	Colchester ..	·75	32
5110	,, ..	Samme, J. E... ..	Woolwich ..	·75	33
5452	,, ..	Griffiths, H.	Egypt	·75	34
5250	,, ..	King, H. T.	Chatham ..	·75	35
5374	,, ..	Cox, J. W.	Netley	·74	36
19446	Lce.-Cpl. ..	Davies, D.	Colchester ..	·74	37
5023	Private ..	Grist, R.	London ..	·74	
12461	Serjeant ..	Cook, P. F.	Netley	·73	38
1951	Private ..	Money, F. J. R. ..	Malta	·73	39
5368	,, ..	Bowden, R. J. ..	York	·73	40
17844	Serjeant ..	Clenshaw, W. A. ..	Netley	·72	41
12819	,, ..	Riches, W. H. ..	Curragh ..	·72	
1620	Corporal ..	Pegg, A. E.	Egypt	·71	42
1342	,, ..	Davis, H.	South Africa ..	·70	43
19536	Lce.-Cpl. ..	Reece, W. E... ..	Edinburgh ..	·70	44
13032	Serjeant ..	Kerr, T.	Curragh ..	·70	45
12779	,, ..	Stubbs, G. S... ..	Egypt	·70	45
5463	Private ..	Taylor, H. E... ..	Cork	·70	46
5592	,, ..	Ness, A.	Edinburgh ..	·69	47
16678	Serjeant ..	March, J. E.	Cambridge Hosp.	·69	48
2013	Private ..	Connell, W. J. ..	Malta	·68	49
1969	,, ..	Overton, G. W. ..	,, ...	·68	50
5316	,, ..	Wall, W. G. H. ..	Cambridge Hosp.	·65	51
943	,, ..	Ball, A. H.	Egypt	·65	
5232	,, ..	Drury, S. T.	Shorncliffe ..	·65	52
5290	,, ..	Hadfield, E.	Netley	·64	53
4593	,, ..	Martin, P. G... ..	Chatham ..	·64	54
19776	Lce.-Cpl. ..	Swan, G.	Malta	·64	55
5384	Private ..	Millins, G. P... ..	London ..	·63	56
5358	,, ..	Fenn, G. D.	Curragh ..	·62	57
4737	,, ..	Hayles, H. D. ..	Malta	·61	58
4564	,, ..	Bowern, J. W. ..	,, ...	·61	59
1865	,, ..	Johnstone, R. ..	,, ...	·59	60
1985	,, ..	Brown, R. H... ..	Egypt	·57	61

Examined in one Subject only.

1688	Private ..	Drew, G. H. F. ..	Malta	..	Passed.
12592	Serjeant ..	Fraser, J. G.	,, ...	..	,,

NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified:—

No.	Rank	Name	Date	No.	Rank	Name	Date
17210	Serjt.	James, C. E. ..	15.1.13	6726	Pte. ..	Salter, W. S. ..	5.9.13
*12461	,, ..	Cook, P. F. ..	13.5.13	6765	,, ..	Allen, C. W. ..	5.9.13
6552	Pte. ..	Craib, W. ..	1.7.13	1406	L.-Cpl.	Newland, F. H.	12.9.13
6390	,, ..	Wyatt, P. ..	2.7.13	1825	,, ..	Williams, A. G.	12.9.13
6620	,, ..	Jennings, H. ..	5.7.13	7296	Pte. ..	Percival, W. A.	1.9.13
6624	,, ..	Paulley, A. ..	5.7.13	*18383	Cpl. ..	Hutchings, W.	15.9.13
6376	,, ..	Norman, W. F.	23.7.13	18199	,, ..	Staff, A. H. ..	15.9.13
6071	,, ..	Rawlings, G. H.	24.7.13	19282	,, ..	Golden, H. ..	15.9.13
*18507	Cpl. ..	Gerrie, W. A...	24.7.13	10965	Serjt.	Howlett, J. ..	16.9.13
7270	Pte. ..	Collier, W. A...	1.8.13	6652	Pte. ..	Notson, C. A...	17.9.13
1116	L.-Cpl.	Lockwood, J. W.	16.8.13	4907	,, ..	Freemantle, A. J.	23.9.13
5884	Pte. ..	Jay, E. B. ..	19.8.13	6601	,, ..	Elliott, W. ..	24.9.13
6706	,, ..	Sims, G. J. ..	25.8.13	6628	,, ..	Grant, A. ..	24.9.13
6694	,, ..	Cheney, T. J. S.	26.8.13	6860	,, ..	Brooks, A. W...	24.9.13
6701	,, ..	Yeandle, W. R.	26.8.13	6010	,, ..	Willcock, R. ..	29.9.13
6723	,, ..	Harrison, D. ..	26.8.13	6748	,, ..	Lockwood, F...	29.9.13
6737	,, ..	Clark, S. ..	26.8.13	6750	,, ..	Mooney, M. ..	29.9.13
6821	,, ..	Gamage, D. ..	26.8.13	6791	,, ..	Fletcher, J. ..	29.9.13
6604	,, ..	Tattersfield, G. V.	2.9.13	6898	,, ..	Conway, J. ..	29.9.13
6657	,, ..	Vann, H. W. ..	5.9.13	1971	,, ..	Cox, J... ..	1.12.12

* Supernumerary.

ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from October 1, 1913:—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
68	Chew, P. B.	5136	Holness, T.	5307	Garley, S. W.
934	Giles, T.	5151	Francis, G. E.	5327	White, L.
2166	Mathias, W. T.	5224	Barnard, J. F.	5373	Busby, A.
4330	Morman, H. R.	5244	Hourston, E. W.	5592	Ness, A.
4366	Dunlop, J.	5260	Bew, A. J.	5637	Grist, J.
4857	Hall, T. G.	5266	Toghill, F	6218	Cockerell, A. W.
5027	Bonney, S. J.	5281	Jerred, A.	7066	McCarthy, F. B.
5037	Sykes, W. J.	5290	Hadfield, E.		

As Clerks.

No.	Name	No.	Name	No.	Name
1903	Reynolds, A. A.	5303	Messenger, A.	5831	Harburn, C.
2259	Wilson, S. W.	5517	Andrews, W. G. E.	5946	Clarkson, J.
5076	Phillips, F. H.	5646	Holdup, P. L.		

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
1797	Mudge, W.	5698	Brownlie, J.	6267	Gould, E.
2150	Fraser, E. G.	5704	McCall, J.	6273	Parnell, H. A. H.
4368	Hardy, C.	5738	Riley, J.	6333	Giles, T. F.
4684	McEnaney, J.	5747	Cotter, D. C.	6341	Morley, J. L.
4854	O'Donnell, J. J.	5865	Sewell, B.	6344	Pucknell, A. W. C.
4870	Poules, S.	5892	Reynaert, J. W.	6365	Poulton, W. S.
4946	Hastings, A.	5947	Burt, G. R.	6370	Webber, R. W.
5026	Humphreys, W.	6076	Winterton, J.	6457	Kenward, F.
5230	Wright, C.	6097	Portsmouth, E. L.	6535	Potter, J. H.
5645	Brough, A.	6256	Donovan, J.	6631	Merry, S. H.
5686	Brookes, F. C.	6259	Attfield, C. G.	6954	Fallaize, W. E.

As Cooks.

No.	Name	No.	Name	No.	Name
2112	Hickmott, W. E.	5661	Phillips, C. E.	6203	Pye, E. G.
4371	Lines, G. T.	5805	Bright, W.	6269	Dixon, A. H.
4656	Mathieson, G.	5903	Todd, A. W.	6345	Witney, F. W.
4896	Holdsworth, H.	5984	Raben, N.	6471	Corner, R. S.
5503	Banks, W. J.	6168	Watts, S. G.		
5623	Hammett, W. T.	6199	Finlayson, P.		

SANITARY ORDERLIES.

The following Privates are advanced to the Fourth Rate of Corps Pay at 6*d.*, as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
4735	Ellarby, R. H. ..	26.4.13	6567	Warren, F. R. ..	6.7.13
6472	Britton, J. M. ..	14.6.13	19511	Kennedy, H.	7.7.13
1485	Tipping, J.	25.6.13	5678	Ford, R. H.	8.7.13
6619	Ransom, A. H. ..	25.6.13	6613	Frater, C. H.	16.7.13
249	Scovell, A. H. ..	27.6.13	4378	Butler, J.	18.7.13
6574	McLaren, J.	1.7.13	6026	Lynch, F.	20.7.13
5780	Wingfield, G. C. ..	1.7.13	4548	Pritchett, F.	21.7.13
6449	Stocks, E.	1.7.13	6615	Whelan, E. R. ..	24.7.13
19650	Gawn, H.	5.7.13	6025	Stallwood, W. A. ..	1.8.13
5600	Roberts, R.	5.7.13	5658	Osment, A.	7.8.13
6434	Waterman, T. ..	5.7.13	1521	Palmer, T. A. ..	13.8.13
6435	Bell, G. S.	6.7.13	5402	Sexton, P.	15.8.13

BUGLERS.

The following boys are appointed Buglers from the dates specified :—

No.	Name	Date	No.	Name	Date
6550	Lever, W. E.	3.7.13	5735	Treanor, A. L. ..	13.8.13

ADVANCEMENT CORPS PAY CANCELLED.

The advancement of the undermentioned Privates to the Fourth Rate of Corps Pay at 6*d.*, as Orderlies, is hereby cancelled.

No. 5482 Laird, A. G. ; No. 5928 Beckett, J.

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED AS DISPENSERS.

No.	Rank and Name		No.	Rank and Name	
17834	Corporal ..	Harman, F.	19821	Lce.-Corpl.	Young, B. L.
17960	,, ..	McGuire, T.	29	,, ..	Hart, J.
19401	Lce.-Corpl.	Harland, A. E.	19814	,, ..	Croker, A. G.
18832	Corporal ..	Heard, G.	4696	Private ..	Phillips, A. E.
12594	,, ..	Wright, W.	1751	,, ..	Plaum, F. H.
1591	Private ..	Ince, J.	1569	,, ..	Farmer, G. L.
501	,, ..	Benson, O.	1342	,, ..	Davis, H.
22	,, ..	Church, W. R.	2210	,, ..	Fletcher, W.
4763	,, ..	Watson, E. R.	4406	,, ..	Sprinks, A. E.
4357	,, ..	Harding, T. H.	19202	Corporal ..	Baiden, F. J. R.
19303	Corporal ..	Green, R. T.	1603	Private ..	Dolan, B.
15683	,, ..	Dent, T. P.			

THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

For Staff-Serjeant.

12129	Serjeant ..	Barnes, S. M.	17573	Serjeant ..	Harlen, C.

For Serjeant.

19884	Corporal ..	Hort, F. E.	1843	Corporal ..	Mack, C. A.
12280	Serjeant ..	Endacott, A.	19303	,, ..	Green, R. T.
15289	Corporal ..	Rodman, H. R. M.	18200	,, ..	Collings, W. G.

For Corporal.

2299	Private ..	Hall, E.	4451	Private ..	Davis, C. K.
5566	,, ..	Douce, T.	91	,, ..	Bates, R.
1951	,, ..	Money, F. J. R.	1969	,, ..	Overton, G. W.
4700	,, ..	Gardner, F.	5076	,, ..	Phillips, F. H.
5763	,, ..	Littlemore, S. H.	6451	,, ..	Cocks, G. A.
4643	,, ..	Lillywhite, P.	4935	,, ..	Andrews, W.
5281	,, ..	Jerred, A.			

DISEMBARKATIONS FROM ABROAD.

From Sierra Leone, per s.s. "Olenda," October 15, 1913.

103	Corporal ..	Steer, G. P.	296	Private ..	Wilson, F. G.
1843	,, ..	Mack, C. A.			

EMBARKATIONS FOR ABROAD.

To Mauritius, per s.s. "Dunluce Castle," November 1, 1913.

10993	Sjt.-Major	Reynolds, R.	11049	S.-Serjeant	Ulph, W.
11392	Lce.-Serjt.	Conner, E.	17787	Corporal ..	Whyatt, A.
19734	Lce.-Corpl.	Peters, H.	5180	Private ..	Jones, W.
15384	Private ..	Coles, C.	5023	,, ..	Grist, R.
6014	,, ..	Clark, W.	5295	,, ..	Desperques, H.
4962	,, ..	Matheson, J.	5279	,, ..	Millgate, E.
5232	,, ..	Drury, S.			

NOTES FROM ABERDEEN.—The following notes, which have been sent us from Scotland, may be of interest to the Royal Army Medical Corps:—

"On November 7, 1912, Mr. Dankester, who has completed twenty-one years' service as Sacrist at King's College, Aberdeen, was presented with a handsome clock from the lecturers of the College.

"Mr. Dankester first enlisted in the Royal Artillery on July 14, 1870. He took part in the Afghan Campaign and was present at the Battle of Maiwand. During the campaign he acted as hospital serjeant in the battery hospital. In 1882 he joined the Medical Staff Corps, in which he served till appointed Sacrist at King's College, Aberdeen, in 1891. On discharge from the service he was granted an exemplary character and received the medal for good conduct."

NOTES FROM MAURITIUS.—Serjeant H. E. Tyler writes, October 10: "It is a long time since any news appeared in the Corps Journal concerning the company stationed on the picturesque little island of Mauritius, and the following notes may be of interest:—

"The football season of 1912-13 was concluded yesterday by an exhibition match between 'G' Company, 2nd Hants Regiment (winners of the Mauritius Military Football League) and 'Rest of Garrison.' Referee, Serjeant-Major F. Higdon, R.A.M.C. Result, a draw, 1—1.

"On conclusion of the match, medals and the Mauritius Military Football Shield were presented to the winners by Major-General C. R. Simpson, C.B., Commanding the Troops, who heartily congratulated the winners on their achievement and wished them luck for the future. During the course of his speech reference was made to the very sportsmanlike manner in which the league matches had been carried out. The General Officer Commanding explained that when he spoke of sportsmanship he referred specially to the Royal Army Medical Corps, who, although having only thirty-five men to pick from and duty to do at all hours of the day and night, yet managed to turn out a team for every match, and in spite of having no hope of losing the bottom place in the league, turned up smiling every time and completed their full programme.

"Serjeant-Major Higdon was also highly praised for his excellence as a referee and his services to football generally in the Command.

"It might be mentioned that Lance-Corporal Ellard, R.A.M.C,, was selected to play for the 'R. of G.,' although, perhaps, being among strangers, he did not show his usual form, but nevertheless played with his usual vigour.

"In conclusion, I think our small company may justly claim to have worthily upheld the honour of sport in the Corps, and have done their best to emulate the splendid achievement of our Aldershot teams, whose successes are very dear to their comrades grilling, but not complaining, in far distant climes.

"Below is given an extract from the table of final results, showing the position of the winners and the R.A.M.C.:—

	P.	W.	L.	D.	G. F.	G. A.	Points
'G' Company	20	15	1	4	48	13	34
'R.A.M.C.'	20	1	16	3	13	54	5"

NOTES FROM SIMLA.—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director of Medical Services (British Service) writes as follows, dated October 23, 1913:—

"*Specialists.*—The following officer has been appointed specialist in the subject and Division noted against him: Captain J. B. Hanafin, electrical science, 3rd (Lahore) Division.

"*Appointments.*—A list is attached showing the officers who will hold charge of large station hospitals next year, who have been detailed for service in Burma and Aden, and who have appointed embarking medical officers for the current trooping season. A list of inter-divisional transfers which will take place during the current trooping season is also attached.

"The following appointment has been made: Major E. P. Connolly has been appointed Deputy Assistant Director, Medical Services (mobilization), 2nd (Rawal Pindi) Division.

"*Exchange.*—An exchange for duty in India between the following officers has been effected: Lieutenant-Colonel J. M. F. Shine to 1st (Peshawar) Division, *vice* Lieutenant-Colonel (Brevet-Colonel) C. H. Melville, 8th (Lucknow) Division, to Home Establishment. Major J. W. H. Houghton to 7th (Meerut) Division, *vice* Major J. S. Bostock, 7th (Meerut) Division, to Home Establishment. Captain H. L. Howell remains in 6th (Poona) Division, *vice* Captain C. P. O'Brien-Butler, to Home Establishment.

"*Selected for Increased Pay.*—Lieutenant-Colonel J. S. Davidson has been selected for increased pay from September 13, 1913, under Article 317 of the Royal Warrant."

Rank and name	Division in which at present serving	Division to which posted	Remarks
Major H. G. F. Stallard ..	1st ..	5th	For appointment as D.A.D.M.S. (Mobilization)
Captain A. L. Stevenson ..	1st ..	9th ..	—
Major L. M. Purser ..	2nd ..	7th ..	—
Major J. M. Sloan	4th ...	3rd	For appointment as D.A.D.M.S. (Mobilization)
Captain G. G. Collett ..	4th ..	7th ..	—
Captain W. B. Rennie ..	4th ..	5th ..	—
Captain J. W. Lane ..	5th ..	3rd ..	—
Major A, W. Gibson ..	6th ..	3rd ..	—
Major J. T. Johnson ..	7th ..	8th	For appointment as D.A.D.M.S. (Sanitary)
Major J. D. Alexander ..	8th ..	5th ..	—
Major St. J. B. Killery ..	9th ..	8th ..	—
Captain A. H. T. Davis ..	9th ..	6th ..	—

"I.—The following Officers have been selected to command Station Hospitals at Division and Brigade Headquarters. Tenure: Those marked with an asterisk, two years, which may be extended; those not so marked, ordinarily for three years, which may be extended. Selected Lieutenant-Colonels will, when practicable, be placed in these appointments in order to assume charge of the office of the Deputy-Assistant Director of Medical Services during his absence on duty:—

Rank and Name	Station	Date of appointment	Date of completing tenure	Remarks
Lieut.-Col. E. G. Browne, V.H.S.	Peshawar ..	Oct., 1912	Oct., 1915	—
Lieut.-Col. J. M. F. Shine..	Nowshera* ..	Nov., 1913	Nov., 1915	From England.
,, H. J. Fletcher..	Rawal Pindi	Jan., 1913	Jan., 1916	—
,, H. E. Cree ..	Sialkot ..	,, 1913	,, 1916	—
,, T. Du B. Whaite	Lahore Cantonment*	Feb., 1914	Feb., 1916	From England.
,, L. Way ..	Ferozepore* ..	Oct., 1913	Oct., 1915	—
,, W. L. Gray ..	Jullundur ..	Feb., 1912	Feb., 1915	—
,, H. Carr ..	Ambala ..	,, 1912	,, 1915	—
,, F. W. C. Jones	Meerut ..	March, 1912	March, 1915	—
,, G. A. T. Bray..	Delhi ..	Feb., 1914	Feb., 1917	From England.
,, J. S. Davidson .	Agra	Nov., 1912	Nov., 1915	—
,, W. Hallaran ..	Bareilly ..	Sept., 1913	Sept., 1916	—
,, S. C. Philson ..	Lucknow ..	Nov., 1913	Nov., 1916	—
,, W. T. Mould ..	Fyzabad ..	,, 1912	,, 1915	—
,, F. W. Hardy ..	Allahabad* ..	,, 1913	,, 1915	—
,, C. C. Reilly ..	Calcutta ..	Oct., 1913	Oct., 1916	—
,, E. Eckersley ..	Quetta ..	Jan., 1914	Jan., 1917	—
,, E. M. Hassard..	Karachi ..	July, 1912	July, 1915	—
,, R. W. Wright..	Mhow ..	Sept., 1912	Sept., 1915	—
,, R. J. W. Mawhinny	Nasirabad* ..	April, 1913	April, 1915	—
,, J. Donaldson ..	Jubbulpore ..	March, 1913	March, 1916	—
,, C. R. Elliott ..	Jhansi* ..	Oct., 1911	Oct., 1914	By extension.
,, R. J. Windle ..	Poona ..	March, 1913	March, 1916	—
,, H. M. Adamson	Belgaum ..	,, 1914	,, 1917	From England.
,, A. T. I. Lilly ..	Colaba ..	Oct., 1913	Nov., 1914	—
Major J. Hennessy.. ..	Ahmednagar	,, 1913	Oct., 1916	—
Lieut.-Col. E. A. Burnside	Bangalore ..	Nov., 1912	Nov., 1915	—
,, C. A. Lane ..	Madras* ..	March, 1912	March, 1915	By extension.
,, G. G. Adams ..	Secunderabad	,, 1912	,, 1915	—
Major F. W. Begbie ..	Maymyo* ..	Nov., 1913	Nov., 1915	—
,, H. W. K. Read ..	Rangoon* ..	May, 1913	May, 1915	—

"II.—To command Station Hospitals at Hill Stations. Tenure (usually reckoning from March), two years, which cannot be extended. Appointments to be so arranged as to allow, as far as practicable, of each officer (except selected Lieutenant-Colonels) having at least one tour of duty in the hills during his current Indian tour.

Rank and Name	Station	Date of appointment	Date of completing tenure	Remarks
Lieut.-Col. H. I. Pocock ..	Murree ..	Nov., 1913	Nov., 1914	—
,, G. F. H. Marks	Dalhousie ..	March, 1913	March, 1915	—
Major R. H. Lloyd ..	Dagshai ..	,, 1914	,, 1916	—
,, R. J. Blackham ..	Jutogh ..	Feb., 1913	Feb., 1915	—
,, M. M. Lowsley ..	Kasauli ..	Sept., 1913	Sept., 1915	—
,, W. R. P. Goodwin..	Landour ..	Dec., 1913	Dec., 1915	—
Lieut.-Col. R. H. Penton..	Ranikhet ..	March, 1913	March, 1915	—
,, J. Fallon ..	Chakrata ..	Oct., 1913	Oct., 1915	—
Major J. H. R. Bond ..	Naini Tal ..	Feb., 1913	Feb., 1915	—
,, R. T. Brown ..	Darjeeling ..	March, 1913	March, 1915	—
,, S. J. C. P. Perry ..	Lebong ..	,, 1914	,, 1916	—
,, W. C. Croly	Mount Abu ..	Oct., 1913	Oct., 1915	—
,, J. Cowan	Pachmarhi ..	March, 1914	March, 1916	—
,, L. P. More	Wellington ..	,, 1914	,, 1916	—

"III.—*Aden Reliefs.*

"*Establishment.*—Two field officers and three captains to be detailed by name, ordinarily from those serving in the first six divisions and entering on the last year of their Indian tour.

"Major L. F. Smith,[1] 1st (Peshawar) Division, to arrive at Aden by the 4th Transport 'Rohilla,' November 19, 1913, from Karachi, *vice* Major S. W. Sweetnam, on leave *ex* India, reverting to the Home Establishment at the expiration thereof.

"Captain R. G. S. Gregg, 4th (Quetta) Division, *vice* Major H. K. Palmer, sailing by the 10th Transport 'Dongola,' February 18, 1914, from Karachi, for charge of the Brigade Laboratory, *vice* Captain W. F. M. Loughnan.

"Captain J. R. Lloyd, 5th (Mhow) Division, *vice* Captain E. D. Caddell, sailing by the 4th Transport 'Rohilla,' November 19, 1913, from Karachi.

"Captain A. L. Foster, 2nd (Rawal Pindi) Division, *vice* Captain W. F. Loughnan, sailing by the 10th Transport 'Dongola,' February 18, 1914, from Karachi.

"Captain C. E. L. Harding, 4th (Quetta) Division, *vice* Captain M. O. Wilson, sailing by the 10th Transport 'Dongola,' February 18, 1914, from Karachi.

"IV.—*Burma Reliefs.*

"*Establishment.*—Seven field officers and nine captains and lieutenants to be detailed by name from the 7th (Meerut), 8th (Lucknow), and 9th (Secunderabad) Divisions. Tenure: Two years, extendible to three years. On return to India they are eligible for hill stations in any of these Divisions.

"*(a) To be Transferred from Burma* (1913-14).

Rank and Name	Division to which posted	Remarks
—	*Nil*	—

[1] To command Station Hospital, Aden.

"(*b*) *To be Transferred to Burma* (1913-14).

Rank and Name	From whence detailed	Remarks
Major F. W. Begbie ..	5th (Mhow) Division ..	—
,, S. O. Hall	4th (Quetta) ,, ..	—
,, E. G. Ffrench ..	9th (Secunderabad) Division	—
Captain S. Shepherd ..	7th (Meerut) Division ..	—

"V.—*Embarking Medical Officers.*

"For duty in connection with the embarkation and disembarkation of troops and invalids, during the season 1913-14.

"Bombay—Captain C. M. Rigby; Karachi—Captain W. A. Spong."

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned Lieutenants to be Captains: Morton W. Ruthven, M.B., dated October 31, 1913. Thomas Lindsay, M.B., dated November 12, 1913.

Lieutenant George Rollason resigns his commission, dated November 12, 1913.

The undermentioned Lieutenants are confirmed in their rank: Edmund T. Burke, Thomas I. Dun, Thomas J. Kelly, John F. Meenan, Frederick L. Tulloch, M.B.

TERRITORIAL FORCE.

Royal Field Artillery.

1st Lowland Brigade, Surgeon-Captain (Honorary Lieutenant in the Army) William M. Taylor, M.D., to be Surgeon-Major, dated September, 13, 1913.

Royal Army Medical Corps.

Colonel Richard Harman Luce, M.B., F.R.C.S., Territorial Force Reserve, Army Medical Service, is appointed to the Honorary Colonelcy of the Royal Army Medical Corps of the Territorial Force in the North Midland Territorial Division, *vice* Honorary Colonel John C. Bond, F.R.C.S., who vacates that appointment, dated November 5, 1913.

Colonel de Burgh Birch, C.B., M.D., Retired List, Army Medical Service, is appointed to the Honorary Colonelcy of the Royal Army Medical Corps of the Territorial Force in the West Riding Territorial Division, *vice* Honorary Colonel John D. Eddison, M.D., whose tenure of that appointment has expired, dated November 5, 1913.

Colonel William Coates, C.B., Territorial Force Reserve, is appointed to the Honorary Colonelcy of the Royal Army Medical Corps in the East Lancashire Territorial Division, dated November 12, 1913.

Colonel Joseph Whitfield Blandford, Retired List (late of the Army Medical Service) is appointed to the Honorary Colonelcy of the Royal Army Medical Corps in the Northumbrian Territorial Division, *vice* Honorary Colonel Sir George H. Philipson, Kt., M.D., who vacates the appointment, dated November 12, 1913.

1st South Western Mounted Brigade Field Ambulance.—Captain Alexander Weatherhead French, from the List of Officers attached to Units other than Medical Units, to be Captain, dated November 15, 1913.

6th London Field Ambulance.—Lieutenant Frank Colman, from the 5th London Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated October 13, 1913.

3rd Lowland Field Ambulance.—Captain James H. H. Pirie, M.D., is seconded, under the conditions of paragraph 112 of the Territorial Force Regulations, for service under the Colonial Office, dated October 1, 1913.

2nd London (City of London) General Hospital.—Captain Henry P. Dean, M.B., F.R.C.S., resigns his commission, dated November 12, 1913.

1st Western General Hospital.—Lieutenant-Colonel Thomas H. Glynn, M.D., resigns his commission, dated November 12. 1913.

Major Sir Ronald Ross, K.C.B., F.R.S., F.R.C.S., to be Lieutenant-Colonel, dated November 12, 1913.

Captain Peter Davidson, M.B., to be Major, dated November 12, 1913.

Captain Arthur John Evans, F.R.C.S., from the 1st West Lancashire Field Ambulance, Royal Army Medical Corps, to be Captain, whose services will be available on mobilization, dated November 12, 1913.

1st Home Counties Field Ambulance.—Quartermaster-Serjeant Randall Walter Beale to be Transport Officer, with the honorary rank of Lieutenant, dated November 19, 1913.

6th London Field Ambulance.—Lieutenant Walter B. Parsons resigns his commission, dated November 19, 1913.

1st North Midland Field Ambulance.—Captain Edwin A. Wraith to be Major, dated November 19, 1913.

Sanitary Service.

Thomas Evan Francis, M.D., to be Captain, whose services will be available on mobilization, dated September 1, 1913.

Officers attached to other Units.

Lieutenant Lionel D. Bailey to be Captain, dated August 4, 1913.

Lieutenant James M. Kirkness, M.B., to be Captain, dated August 1, 1913.

The undermentioned Lieutenants resign their commissions, dated November 12, 1913: Richard C. Roberts, Frederick G. Harper, M.B.

Lieutenant Lionel H. Moiser, M.B., to be Captain, dated September 11, 1913.

Ernest White to be Lieutenant, dated October 14, 1913.

Supernumerary for Service with the Officers Training Corps.

Patrick Nicol, M.B., to be Lieutenant, for service with the Aberdeen University Contingent, Senior Division, Officers Training Corps, dated September 29, 1913.

TERRITORIAL FORCE RESERVE.

Royal Army Medical Corps.

Major William Owen Evans, from the Unattached List for the Territoral Force, to be Major, dated October 11, 1913.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss A. Willes, to Devonport, from Dublin; Miss M. Walker, to Dublin, from Devonport.

Promotions.—The undermentioned Staff Nurse to be sister: Miss C. V. S. Johnson.

Appointments Confirmed. Staff Nurses.—Miss D. M. Best, Miss A. Seale, Miss A. M. Cochran.

THE ROYAL ARMY MEDICAL COLLEGE.

On the afternoon of October 29, 1913, a distribution of prizes by Surgeon-General Sir Havelock Charles, G.C.V.O., took place at the Royal Army Medical College. A large company assembled to do honour to the occasion, among them being Surgeon-Generals Donovan, Sir David Bruce, Evatt, Whitehead, Macnamara, Sir Francis Trevor, Sir Charles Cuffe, May (Director General of the Medical Department, Royal Navy), Sir James Porter, Sir A. Bradshaw, and many others, including Major Sir Ronald Ross, Lieutenant-Colonel P. J. Freyer, Dr. Galloway. Mr. Barker, Dr. Mott.

Surgeon-General W. Babtie, V.C., representing the Director-General, who was unable to be present, opened the proceedings by calling upon the Commandant to read his report, whereupon Colonel Skinner (Commandant) reviewed the session, the 106th of the Junior Class of the College, being also the twenty-third held in London. After referring to the Seventeenth International Congress of Medicine, the naval and military section of which held its meetings at the College, he said there had been some changes in the staff. While regretting the completion of tenure of their appointments, they of the College wished God-speed to Major W. S. Harrison, lately Professor of Tropical Medicine, and to Major J. C. Kennedy, Assistant Professor of Pathology, with the hope that their talents, so long devoted to this College, might find fields fruitful of discovery awaiting the application of their highly trained energies. On the other hand they

welcomed their successors, Lieutenant-Colonel O. L. Robinson in the chair of Tropical Medicine, and Major S. L. Cummins as Assistant Professor of Pathology.

With regard to the class now being closed he reminded his audience that these officers were fully qualified doctors before passing into the College, where they had been instructed in matters relating especially to the preservation of the health and physical well-being of the soldier. He had nothing but praise for the young officers who composed this class, for they had been most assiduous and attentive, while those who had gained prizes had done remarkably well, and in two cases brilliantly, for instance, the winner of the Fayrer and Marshall Webb medals had gained over 90 per cent of marks in those competitions.

He then read the names of those who had gained prizes, as well as those who came second, as follows :—

1st. The Herbert Prize, highest total of marks, Lieutenant R. B. Price, R.A.M.C., 565 out of 700 marks; proxime accessit, Lieutenant H. C. D. Rankin, R.A.M.C., 536 out of 700 marks.

Hygiene:—1st. Parkes Memorial, Lieutenant R. B. Price, R.A.M.C., 153 out of 200 marks; proxime accessit, Lieutenant A. K. Sinha, I.M.S., 151 out of 200 marks. 2nd. De Chaumont, Lieutenant A. L. Urquhart, R.A.M.C., 144 out of 200 marks; proxime accessit, Lieutenant H. C. D. Rankin, R.A.M.C., 142 out of 200 marks.

Pathology:—1st. Fayrer Prize, Lieutenant S. S. Sokhey, I.M.S., 181 out of 200 marks; proxime accessit, Lieutenant N. M. Mehta, I.M.S., 160 out of 200 marks. 2nd. Tulloch Memorial, Lieutenant R. B. Price, R.A.M.C., 168 out of 200 marks; proxime accessit, Lieutenant A. L. Urquhart, R.A.M.C., 164 out of 200 marks.

Surgery.—1st. Montefiore, Lieutenant A. Seddon, I.M.S., 80 out of 100 marks. 2nd. Montefiore, Lieutenant H. C. D. Rankin, R.A.M.C., 75 out of 100 marks.

Tropical Medicine:—1st. Ranald Martin Gold medal, Lieutenant A. K. Sinha, I.M.S., 86 out of 100 marks; proxime accessit, Lieutenant R. B. Price, R.A.M.C., 84 out of 100 marks.

Administration:—1st. Marshall Prize, Lieutenant H. C. D. Rankin, R.A.M.C., 97 out of 100 marks; proxime accessit, Lieutenant R. B. Price, R.A.M.C., 88 out of 100 marks.

Sir Havelock Charles then distributed the prizes with a few appropriate words to each recipient, and in his address advised and encouraged the young officers as to their course in life, directing his remarks more particularly to those whose careers would lie in India. He said it was often asked why in life the race was not always to the swift, nor the battle to the strong; the reason was that some men had not the tact and judgment to avail themselves of the chance when it offered. They failed through lack of character. The greatest of all assets was character. He was present at a similar meeting to this thirty-one years ago, and though he could not recall that any address was given on that occasion, he remembered that on his way up to town he travelled with Sir Joseph Fayrer, whose advice he asked as to how to get on in India. After looking at him for a few seconds Sir Joseph said, "Do what you are told; don't grumble; go where you are ordered." Of course young men going to India would have troubles like everyone else, like the panel doctor as well as the medical man in Harley Street; but they should remember Sir Joseph Fayrer's advice, and further, they should strive to prove themselves thoroughly reliable, a most valuable characteristic for every officer. They were going to what he considered the most interesting country in the world. He wished them the best of good luck, and gave them the wish of the Persian poet who said, "May the sweet waters of contentment spring up where'er you place your feet."

Surgeon-General Babtie thanked the General Officer Commanding the London District for the interest he had shown in the Corps by his presence on this occasion, and called for a vote of thanks to Sir Havelock Charles, which was given by acclamation.

General Sir Francis Lloyd, Commanding the London District, thanked the Deputy Director-General for giving him this opportunity of letting the company know his appreciation of the work done by the Royal Army Medical Corps, and spoke in sympathetic terms upon the cordial relations springing up between them and the rest of the Army.

The proceedings then closed, and the company adjourned to the Mess, where the officers of the Corps were at home.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS AND INDIAN MEDICAL SERVICE, AT THE CLOSE OF THE SECOND SESSION, 1913.

Hygiene.—Written Examination. Tuesday, October 21, 1913. From 10 a.m. to 1 p.m.

(1) What do you understand by "specific heat" and "latent heat"? How is the temperature of the body regulated during marching?

(2) Describe the different rations issued to the troops in the field on active service. What special benefit is gained by the addition of sugar and meat extract to a ration?

(3) Describe briefly the main points in which barrack sewage differs from that of a manufacturing town. What standards are now laid down for sewage effluents discharging into rivers and streams?

(4) What bacteria are chiefly associated with outbreaks of food poisoning? Describe the circumstances under which food may become infected by these bacteria.

(5) An isolated fort has a water supply of which the following is a description. Give an opinion as to its fitness for drinking purposes:—

The water is obtained from a well 60 ft. deep, situated on a hill-top 300 ft. high and half a mile from the sea. The well is sunk down to but does not penetrate a layer of igneous rock and is imperviously steined in the upper 40 ft. The mouth of the well, which is on the ground level, is provided with a wooden cover and is situated inside a barbed-wire fence. The ground outside is used for grazing and the nearest human habitation is 400 yds. away and 40 ft. below the level of the mouth of the well. The subsoil consists of sand and gravel about 7 ft. deep. The water is pumped from the well by a windmill into a galvanized-iron tank.

On analysis a sample of the water gave the following results:—

Total solids	44·5 parts per 100,000.
Volatile solids	8·0 ,, ,,
Chlorine	10·0 ,, ,,
Free ammonia	0·0008 ,, ,,
Albuminoid ammonia	0·021 ,, ,,
Nitrites	Nil ,, ,,
Nitrates	0·3 ,, ,,
O. absorbed at 80° F. in two hours	0·27 ,, ,,
Hardness, total	5·3 ,, ,,
Hardness, fixed	3·4 ,, ,,
Metals	Traces of zinc.

1,200 organisms per cubic centimetre were found capable of growing in gelatine at 22° C. in three days.

No lactose-fermenting organisms were found in 100 c.c. of the sample.

Pathology.—(Written Examination.) Tuesday, October 21, 1913. From 2.30 p.m. to 5.30 p.m.

(1) Give an account of the various cells, red and white, which are likely to be encountered in the bone marrow in a case of pernicious anæmia.

(2) What are the principal cultural and morphological characteristics of the Klebs-Loeffler bacillus? How would you differentiate this organism from Hoffmann's bacillus?

(3) Give a concise description of the two cycles of development of the parasite of malignant tertian malaria.

(4) Discuss the relationship between the presence of *Filaria bancrofti* in the body and the various morbid conditions associated therewith.

(5) Define the following expressions: Arthrospore, Symbiosis, Endotoxin, Immunity unit, Microgametocyte.

Pathology.—(Practical Examination.) Wednesday, October 22, 1913. From 10 a.m. to 1 p.m.

(1) Make a careful examination of the broth culture marked with your examination number, and write a short account of the chief characteristics of the micro-organisms you have found in it. Leave your stained films, properly labelled, beside your microscope.

(2) Stain the section contained in the watch-glass so as to demonstrate the presence of Gram-negative bacilli. Describe what you have found, and leave your specimen in focus under your oil-immersion lens.

(3) The film, marked "F," has been made from a pathological secretion, and has not been fixed. Examine it microscopically, and write a report of what you have noted and your opinion as to its nature.

(4) Oral examination.

Tropical Medicine.—Wednesday, October 22, 1913. From 2.30 p.m. to 5.30 p.m.

(1) Describe the symptoms and differential diagnosis of a case of para-typhoid fever.

(2) Give in detail the treatment of a case of cholera during—(*a*) The stage of collapse; (*b*) the stage of reaction.

(3) Describe a case of sand-fly fever. What do you know about its causation?

(4) Describe the causation, symptoms, and treatment of tropical abscess of the liver.

Hygiene.—(Practical Examination.) Thursday, October 23, 1913. From 10 a.m. to 1 p.m.

(1) Estimate the amount of oxidizable organic matter at 80°F. in two hours in the water sample "A."

(Stand. sol. $KMnO_4$—1 c.c. = 0·1 mgm. oxygen).

(2) Examine the milk sample "B" and report as to its fitness for issue to patients in hospital.

Military Surgery.—Thursday, October 23, 1913. From 2.30 p.m. to 5.30 p.m.

(1) Describe a typical small-bore bullet wound. What theories have been advanced to explain so-called "explosive" effects? (10 marks.)

(2) A man is hit at 300 yards range by a small-bore bullet about midway between ankle and knee. Describe the probable appearance and subsequent course of such a wound, and the treatment you would adopt (1) on the field, (2) at the base. (30 marks.)

(3) Discuss the effects on large nerve trunks of small-bore bullet wounds, and describe fully the treatment you would adopt in such injuries. (30 marks.)

(4) Describe a perforating small-bore gunshot of the chest, involving the lung only. What are the commoner complications of such a wound, and what would your treatment of them be? (30 marks.)

Organization of Military Hospitals and Principles Governing Medical Charge of Troops. Military Medical Administration. Friday, October 24, 1913. From 10 a.m. to 1 p.m.

(1) How much of his kit does a man admitted to hospital take with him? What is done with the remainder?

(2) Describe the "Admission and Discharge Book." How is a change in the diagnosis of disease entered therein?

(3) What is the procedure the soldier goes through from the time when he arrives at a military hospital for admission until he gets into his bed as a patient?

(4) What is the scheme of nursing in military hospitals?

(5) Describe the chain of responsibility in the administration of a military hospital. How is this linked up with the other branches of the Army and the War Office?

ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

SUMMARY OF THE PROCEEDINGS OF A MEETING OF THIS COMMITTEE (AS RECONSTITUTED AT THE ANNUAL GENERAL MEETING IN JUNE, 1913), HELD AT THE ROYAL ARMY MEDICAL COLLEGE, ON NOVEMBER 10.

Present.

Lieutenant-Colonel S. Guise Moores (Aldershot)—Chairman.

Major J. C. Jameson (Woolwich).
Major C. B. Martin (Cork).
Major G. A. Moore (Chatham).
Major J. R. McMunn (Netley).
Major A. L. A. Webb (Scottish Command).
Major W. J. P. Adye-Curran (Portsmouth).
Major H. B. Fawcus (London).
Major B. B. Burke (Dover).
Major A. B. Smallman (Aldershot).
Capt. S. M. W. Meadows (Salisbury Plain).
Capt. G. A. D. Harvey (London).
Capt. W. Benson (Rawal Pindi).
Capt. C. T. Edmunds (Peshawar).
Capt. W. Mathieson (Roberts' Heights).

The following were unable to attend :—

Major M. H. G. Fell (Cairo).	Capt. H. B. Kelly (Dublin).
Major T. E. Fielding (Plymouth).	Capt. G. R. Painton (Colchester).
Major C. D. Myles (Western Command).	Capt. W. Moriarty (Lucknow).
Major S. B. Smith (Belfast).	Capt. G. E. Ferguson (Northern Command.)

Major E. T. Inkson, V.C. (Bangalore) has not yet arrived from India.

(1) Major D. Lawson having resigned the Chairmanship on proceeding abroad, Lieutenant-Colonel S. Guise Moores was elected in his place, and took the chair.

(2) The Minutes of the previous meeting were read and confirmed.

(3) The Hon. Secretary reported that the inquiry as to the willingness of officers of the Corps to subscribe to the Central Mess Fund showed the following result :—

Willing to subscribe	820	(650 have already paid)
Conditionally willing	40	
Unwilling	80	
No reply yet	100	

and submitted the following statement of accounts :—

Received.	£	s.	d.	*Expended.*	£	s.	d.
Subscriptions (650)	£385	0	0	Loan to Aldershot Mess for Borden Camp of Instruction Mess	£75	0	0
Transferred by the Director-General from "Special Mess Fund"	82	2	6	Grant to Camp of Instruction Mess at the Curragh ..	6	10	0
				Balance Cr.	385	12	6
	£467	2	6		£467	2	6

(4) Letters were read which had passed between the Senior Medical Officer at Tempe, Orange Free State, and the Commandant of the Royal Army Medical College, in which it is stated that, on the closure of the Royal Army Medical Corps Mess at Tempe, it was resolved: "That the assets and presentations belonging to this mess be handed over to the Headquarter Mess, London, for custody and disposal; preference in the disposal of the mess property being given to a Royal Army Medical Corps Mess starting in South Africa, failing that to a Royal Army Medical Corps Mess elsewhere."

To which the Commandant had replied, expressing his willingness to take charge of the property, but suggesting that the question of disposal of the Tempe Mess property be left in the hands of the Committee of the Central Mess Fund which has recently been formed. The Senior Medical Officer, Tempe, replied that he entirely agreed with the suggestion, and that it was the intention of the members of the late mess to leave the property to a Central or Headquarter body for custody and disposal.

Major Fawcus, speaking on behalf of himself and several members of the late Tempe Mess, said that this action met with their warm approval.

The Hon. Secretary was directed to write to the Senior Medical Officer, Tempe, expressing the thanks of the Committee for this generous gift and its high appreciation of the spirit which had prompted it. It was decided that the conditions attaching to the gift be recorded on the Minutes of the Central Committee; and that, as it had been authoritatively stated at the last Annual Meeting that there was no likelihood of other messes being opened, a list of the articles of plate received should be sent to the various messes at home and abroad (except London and Aldershot) for mess secretaries to note their requirements in order that the Committee may decide as to their disposal.

(5) The Committee, as instructed by the Annual General Meeting in June last, considered the question of whether joining contributions to messes should, in the case of subscribers to the Central Mess Fund, be paid, wholly or in part, by that Fund, and the following resolution was moved from the chair and carried unanimously :—

"That the following principles be affirmed :—

(*a*) "It is highly desirable that, ultimately, all officers of the Corps should become subscribers to the Central Mess Fund.

(*b*) "To this end all officers joining after some future date (to be fixed later) should pay an entrance fee to the Central Mess Fund, and thereafter the annual subscription.

(*c*) "All other officers will become members on payment of the annual subscription.

(*d*) "Officers subscribing under either of the above headings shall be relieved of all

joining contributions to messes (including those paid on promotion), the payment of such to be a charge on the Central Mess Fund.

(6) The question of help to the Peshawar Mess, which has lost, by burglary, mess property to the value of nearly £100, was considered.

Captain C. T. Edmunds, late Hon. Secretary of that mess, described the losses, and the difficulties which had been experienced in effecting satisfactory insurance. On a motion from the chair it was resolved unanimously: "That the Central Fund make a grant of £50 to the Peshawar Mess towards meeting its losses by burglary, on the understanding that the present insurance of Peshawar mess property be continued."

(7) The reply from Rawal Pindi to the original circular having stated that debenture charges caused a heavy drain on members of that mess, the question of whether help should be given in redeeming debentures was considered. Several late members of that mess having given information on various points, the Hon. Secretary was directed to write to Rawal Pindi, asking in what way the Central Mess Fund could best help the mess there, with special reference to the question of redemption of debentures, also for full information as to the financial position of the mess, and as to the legal position of the Central Mess Fund in the matter of ownership, should the question of its taking up debentures arise.

(8) In view of the wide distribution of members of the General Committee, it was considered that much preliminary work could be done by a sub-committee, the members of which are easily accessible. A sub-committee was accordingly appointed, the Chairman of the General Committee to preside, and three to form a quorum. The Chairman having proposed the following members, their appointment was unanimously agreed upon:—

Major Jameson, Major Moore, Major Fawcus, Major Smallman, Captain Harvey, Captain Benson.

It was resolved that the next meeting of the General Committee should take place in the first week in February.

Various other matters were then brought before the Committee. As the new mess at the Curragh will, it is hoped, be opened next summer, and assistance will be required in furnishing it, the Hon. Secretary was directed to write the Mess Secretary there for full details of the probable requirements for the consideration of the sub-committee.

Major McMunn drew attention to the exceptional condition of the mess at Netley, where the upkeep of furniture, carpets, curtains, &c., in so large a building falls very heavily on the reduced numbers who are members of the mess. It was decided that the Mess Secretary there be asked to submit details for the consideration of the sub-committee.

Major Jameson asked whether some help could be given from the Fund towards a tent at Ascot or Henley.

Major Smallman suggested that their railway fares should be repaid out of the Fund to members of the Committee coming from distant stations. These matters were held over for future consideration.

The meeting then closed with a vote of thanks to the chair.

NOTES ON GAMES AND SPORT.

Association Football.—Unfortunately a full report of the doings of the Aldershot team from the Hon. Secretary, Serjeant-Major C. Drury, R.A.M.C., was received too late for publication in this number. A summary of it follows:—

Army Cup (1st round) *v.* 1st Scots Guards, won 3—1; (2nd round) *v.* 1st K.R.R.C., won 2—1.

Amateur Cup v. Camberley and Yorktown, won 7—0; *v.* 1st Loyal North Lancs. won 7—0.

Hants Senior Cup v. 1st Scots Guards, won 3—1; *v.* 1st Loyal North Lancs. (replay after a draw), lost 0—1.

Aldershot Senior Military League v. Royal Berks, won 11—0; *v.* Royal Engineers, lost 2—3; *v.* Royal Munster Fusiliers, won 2—1; *v.* 2nd Worcesters won 1—0.

In friendly games the following teams were beaten: Farnham United 13—0; Reading Reserves, 3—1; Army Service Corps, 11—3; Reading Amateurs, 6—1.

The team is picked from the following N.C.O.'s and men: Corporals Prince and Miller; Privates Quelch, Bates, Forshaw, Southall, Gillham, Morris, Veitch, White and Darby, all old players; also Lance-Corporal Brindle; Privates Wykes and Bugler Osborne, all of whom played occasionally for the first team last year.

The R.A.M.C. Boys team, ten of whom are sons of serving, or time-expired, members of the Corps, have carried all before them, with 9 wins and no losses or draws. Sixty-four goals for and 0 against. Their names are Osborne, Conway, Coad, Steer, Tuson, Lever, Elmer, Henfrey, Halliday and Tomlin.

Rugby Football.—Lieutenant A. Rankin played for the Army *v.* United Hospitals. Lieutenants J. L. Huggan and R. C. Carlyle were asked, but were unable to play.

Hockey.—In the first round of the Army Hockey Tournament the Aldershot team defeated the Royal Engineers.

Racing.—Captain O'Brien Butler met with considerable success in the Poona Meeting, shortly before he left for home. During the past year he has ridden twenty winners, nine in England, seven in Ireland, and four in India. Of these events fifteen have been steeplechases, or hurdle races, and five flat races.

Boxing.—Captain M. P. Leahy beat Mr. Whitford, amateur champion of Scotland, in a six-round contest in Dublin, in October.

J. T. Clapham, *Captain.*
20, *Belgrave Road, S.W.* *Hon. Secretary.*

UNITED SERVICE MEDICAL SOCIETY.

The next meeting of the above Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Thursday, December 11, at 5 p.m. Business: "Jean Dominique, 1st Baron Larrey: his life and work," Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., M.B., K.H.S.

Staff-Surgeon Adrian Forrester, R.N.,
7, Whitehall Place, S.W.
Captain G. A. D. Harvey, R.A.M.C.,
Royal Army Medical College, Grosvenor Road, S.W.
Joint Hon. Secs.

OBITUARY.

SURGEON-MAJOR DAVID WOODS.

Surgeon-Major D. Woods, late Army Medical Department, died at Camberley, on September 24, aged 82. He was born at Banbridge, Ireland, on November 1, 1830, and entered the Army as Assistant-Surgeon, 5th Dragoon Guards, on April 7, 1854; transferred to the 23rd Foot on April 4, 1854; Staff, December 14, 1855; and 19th Hussars, June 3, 1864. He was appointed Surgeon, Staff, October 28, 1864; and transferred to the 107th Foot, on January 24, 1865; and to the Royal Artillery on November 7, 1868. He became Surgeon-Major, Army Medical Department, March 1, 1873, and was placed on the half-pay list on April 4, 1874. He served in Turkey, 1854; Canada, 1856; and the East Indies. He took the M.D. degree, McGill University, in 1860.

MAJOR JAMES MOIR.

Major J. Moir, late Royal Army Medical Corps, died at Walton-on-the-Naze, on October 23, aged 53. He was born in St. Kilda, Victoria, Australia, on January 27, 1860. He took the M.B. and M.S. degrees of Aberdeen University in 1883 and joined the Army as a Surgeon, Medical Staff, on July 28, 1886; was promoted Major, Royal Army Medical Corps, July 28, 1898; and placed on retired pay July 28, 1906.

He took part in the South African War and was present at the operations in Cape Colony, in the Orange River Colony, and in the Transvaal from November 30, 1900, to May 31, 1902. He received the Queen's medal with three clasps and the King's medal with two clasps.

DEPUTY SURGEON-GENERAL JOHN SARSFIELD COMYN.

Honorary Deputy Surgeon-General J. S. Comyn, late Medical Department, died at Southsea on November 6, aged 76. He took the Licentiate of the Royal

College of Surgeons, Ireland, in 1857, and the Fellowship in 1874, also the M.B. degree, Dublin University, in the same year.

He entered the Army as Assistant-Surgeon, Staff, in January 22, 1858, transferred to the Royal Artillery, April 8, 1858; was appointed Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, April 1, 1873; Brigade-Surgeon, November 18, 1882; and retired with the honorary rank of Deputy Surgeon-General, January 15, 1883.

Among other places he served in Corfu in 1861, in Canada in 1867, and in Nova Scotia in 1869.

He was employed as a retired pay, Recruiting Medical Officer at Bradford from September 2, 1890, till February 5, 1902.

He took part in the Egyptian Campaign, 1882, for which he received the medal and bronze star and was specially promoted Brigade-Surgeon.

BIRTHS.

OTWAY.—On November 2, at 25, Elphinstone Road, Southsea, the wife of Captain A. L. Otway, R.A.M.C., of a daughter.

PARKES.—At 29, Carlisle Terrace, The Hoe, Plymouth, on November 16, the wife of Major E. E. Parkes, R.A.M.C., of a daughter.

THOMSON.—At 8, Rutland Square, Edinburgh, on November 19, the wife of Major C. G. Thomson, R.A.M.C., of a son.

MARRIAGES.

GREGG—SUTHERLAND.—At Christ Church, Mhow, on October 21, 1913, by the Rev. R. G. Ledgard, Captain Richard George Stanhope Gregg, R.A.M.C., only son of Colonel William Gregg (late Leicestershire Regiment), to Violet Leslie Gordon, daughter of the late Sinclair Sutherland, of Dublin.

STARTIN—BULKLEY.—On November 12, 1913, at the Bombay Cathedral, by the Rev. C. D. T. Mason, M.A., John Startin, Captain, R.A M.C., only son of the late James Startin, M.R.C.S., to Stella Muriel, eldest daughter of Harrington Bulkley, Esq., of the Bombay Salt Revenue.

DEATHS.

WOODS.—At Camberley, on September 24, Surgeon-Major David Woods, late Army Medical Department, aged 82.

MOIR.—At Walton-on-the-Naze, on October 23, Major James Moir late Royal Army Medical Corps, aged 53.

COMYN.—At Southsea, on November 6, Honorary Deputy Surgeon-General John Sarsfield Comyn, M.B., F.R.C.S.I., Lieutenant-Colonel, retired, Medical Department, aged 76.

EXCHANGES, &c.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

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	8	0 5 6	0 2 6				
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	16	0 12 0	0 5 3				
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	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Colonel R. H. Firth, Major J. C. Kennedy, Major P. H. Henderson, Major W. S. Crosthwait, Lieutenant J. E. Hepper, Lieutenant C. M. Finny.

The following publications have been received:—

British: The Cavalry Journal, St. Thomas's Hospital Gazette, The Hospital, The Indian Journal of Medical Research, The Lancet, The Australasian Medical Gazette, The Army and Navy Gazette, The Middlesex Hospital Journal, Public Health, The Medical Review, Red Cross and Ambulance News, The Practitioner, St. Bartholomew's Hospital Journal, The Indian Medical Gazette, Medical Press and Circular, The Royal Engineers' Journal, Tropical Diseases Bulletin, The Lister Institute of Preventive Medicine, The Army Service Corps Journal, Guy's Hospital Gazette, The Medical Journal of South Africa, The Journal of Tropical Medicine and Hygiene, The Journal of State Medicine, The Indian Medical Journal, Journal of the Supply and Transport Corps (Indian Army), The Commonwealth Military Journal, Annals of Tropical Medicine and Parasitology, Journal of the United Service Institution of India.

Foreign: Bulletin de la Société de Pathologie Exotique, Deutsche Militärärztliche Zeitschrift, Boletin de Sanidad Militar, United States Naval Medical Bulletin, Bulletin de l'Institut Pasteur, Archives de Médecine et Pharmacie Navales, Revista de Sanidad Militar, Le Caducée, Tidskrift I Militär Hälsovard, The Military Surgeon, Schmidt's Jahrbücher, Russian Naval Medical Journal, Militaerlaegen, Archiv für Schiffs -und Tropen-Hygiene, Norsk Tidsskrift for Militaermedicin, Bulletin of the United States Department of Agriculture, American Medicine.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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ASSISTED BY

MAJOR C. E. POLLOCK,

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Uniform Case	2	15	0	3	3	0
Shirts	0	7	6	0	8	6
MESS DRESS.						
Jacket	5	10	0	6	10	6
Waistcoat	1	10	0	1	15	0
Overalls	3	0	0	3	10	0
Shirts	0	9	6	0	10	6
UNDRESS.						
Frock Coat	7	7	0	8	14	6
Silk Lining, extra	1	2	0	1	5	0
Forage Cap	1	7	6	1	12	6
" " (F.O.)	1	16	6	2	2	6
Blue Serge Jacket	3	7	6	3	15	0
SERVICE KIT.						
Serge Jacket	3	10	0	3	18	6
Collars per doz.	0	10	0	0	12	0
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Putties	0	6	6	0	7	6
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White Helmet, with Pugree, Spike and Chain	2	2	0	2	7	6
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Pugree Badge (for Colonies only)	0	8	0	0	9	0
Japanned Case	0	10	0	0	11	6
" " for two	0	13	6	0	15	0
White Patrol Jacket	1	7	0	1	10	0
" Mess "	1	2	0	1	5	0
" " Waistcoat each	0	16	6	0	18	6
Buttons for do. "	0	1	3	0	1	6
White Overalls per pair	1	1	0	1	3	6
Khaki Drill Jacket	1	15	0	2	0	0
" " Overalls	0	18	6	1	1	0
Kummerbund	1	10	0	1	15	0
Buttons and Rings per doz.	0	4	6	0	5	0
Stars per pair	0	4	6	0	5	0
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